THE
ELECTRICAL REVIEW

Volume CXXVII. No. 3274

Friday, August 23rd, 1940

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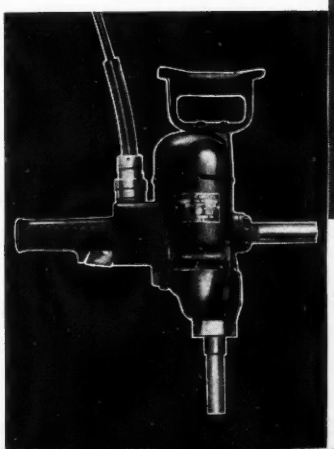

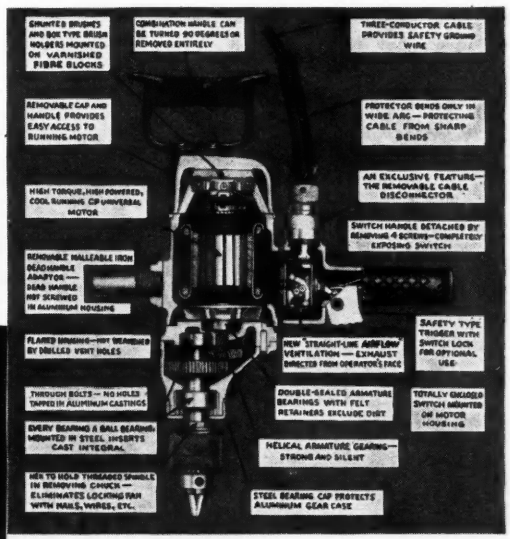
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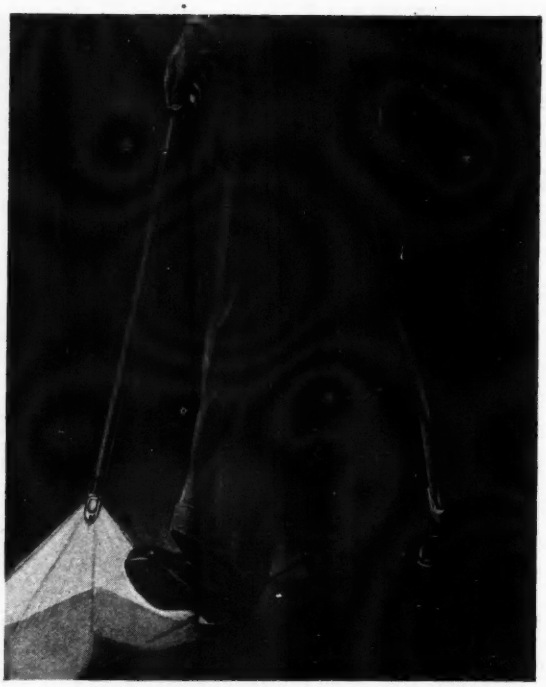

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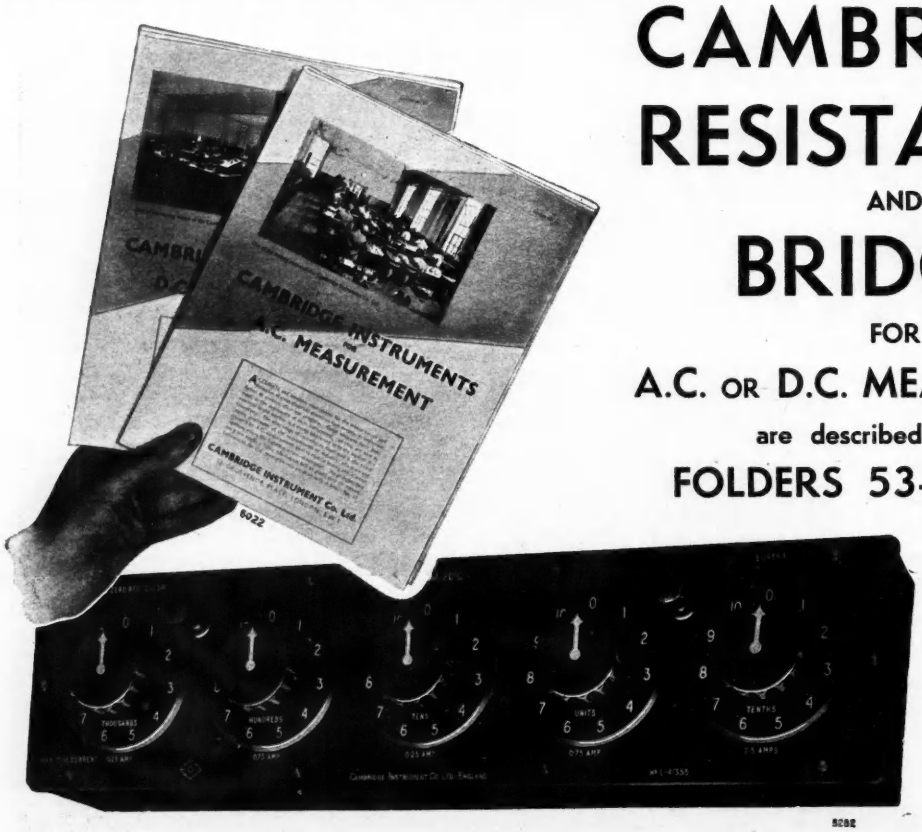

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THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

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Wartime Export Problems

Uncertainties and Remedies

SINCE the capitulation of France the urgent need for war materials has seemed to push the subject of export trade into the background, although the subject is frequently referred to by Parliamentary leaders. Actually, in spite of the devotion of more and more of our manufacturing capacity to the production of munitions and service equipment, export trade is being carried on at a satisfactory level.

The difficulties are naturally many, but none of them is insurmountable. Materials present the greatest problem, particularly steel, but the great drive which is now being made by the Salvage Department of the Ministry of Supply and other measures which have been taken will have an appreciable effect upon the position.

Priority and Labour

"Priority" is another matter which needs greater attention, as is evident from the tenth report of the Select Committee on National Expenditure which is reviewed in this issue. The Service Departments must have first call upon industry; their needs have to be met if we are to conduct the war successfully. But this is not true of all Government orders; they may be important, but they are not all vital. Export trade is of far greater consequence than a great deal of Government Department work.

The war has to be paid for and proceeds from export trade are the best way of securing financial resources. Heavy taxes, although unfortunately very necessary, are not exactly beneficial, and loans have to be paid for and eventually repaid.

The Select Committee in considering the question of priority reviews what was done during the last war; one criticism of that scheme was that insufficient regard was paid to export production. It is hoped that new plans will not repeat this mistake.

Industrial registration is another thing which will cause dislocation and delay in export trade if it is not carefully managed. The Order itself does not mention export trade, but an explanatory memorandum issued with it does make some reference to the subject, albeit in rather vague terms. It says: "Some of those who register will be found . . . to be so important for the maintenance of exports that it appears undesirable to transfer them. After registration, all questions of transfer will be considered individually in the light of the relative importance of the work on which men are now engaged and that for which they are required." What proportion of a man's time must be occupied by work for export to permit him to be kept at his present job?

Export Risk Insurance

Full details are not yet available, but the Government has accepted the principle that export contracts likely to be spread over a long period must carry some form of assurance that prices can be remuneratively maintained. With all the good will in the world our overseas customers cannot agree to place contracts at fluid prices. And, equally, our manufacturers cannot accept work on terms which will involve them in a loss. The remedy is not easy to find. The Government's scheme appears to be confined to increases in marine insurance, Government war risk insurance and freight rates over a maximum period of six months. Presumably, manufacturers will themselves have to make provision in their quotations for possible rises in the cost of labour and materials.

The Export Credits Guarantee Department already issues policies which cover risks of non-payment (up to 90 per cent.) due to the inability of overseas customers to remit funds. The Department's pre-shipment policy gives an exporter security against the risk of loss if an overseas customer cannot, for good reasons, accept delivery of goods contracted for. The new c.i.f. policy will fill a gap and procedure will be simplified by the new war emergency policy which will combine in a single document the policies already in force.

These are some of the problems which the Export Groups are faced with, and it can well be imagined that the going is not easy. Nevertheless, some useful work is being done, although it cannot be said that this work has got beyond preliminaries in many cases. Practically every section of the electrical industry now has its Export Group, and all manufacturers willing and able to undertake overseas contracts should give their support to their appropriate group if they have not already done so. It is also to be hoped that the Government will give sympathetic consideration to any proposals made by the Groups which do not conflict with the main object —the building up of our armaments.

Trolley-bus and Purchase Tax

TRAMCARS, omnibuses and charabancs are specifically exempted from the new Purchase Tax, and we naturally took it that the term "omnibuses" covered trolley-buses. Sir J. Lamb and Mr. Ellis Smith thought otherwise, and on the report stage of the Finance (No. 2) Bill last week moved an amendment excluding trolley-buses from the scope of the tax. Mr. Smith presented the case of the trolley-bus as a substitute for petrol-operated vehicles very well, and thus did some good, although, as the Financial Secretary to the Treasury pointed out, the amendment was unnecessary as trolley-buses were already exempt. He promised, however, that they would be separately mentioned to avoid any further misunderstanding.

Trade Press Censorship

Two or three weeks ago a large number of manufacturers received a letter from the Iron and Steel Control instructing them that no information was to be sent to the technical Press before submission to censorship. As this was a departure from the principles which govern the relationship between the Press and the Ministry of Information, and, moreover, was likely to result in a drying-up of important sources of information, the technical Press made immediate protest to the Ministry. Action was promptly taken and the letter was withdrawn. In spite of this, however, some manufacturers may still have misgivings about sending us news and notes, and we think it necessary to assure them that they need have no hesitation. Anything which appears to us to require the approval of the Ministry will, as hitherto, be submitted for examination.

Aluminium

AN outstanding feature of modern warfare is illustrated by the decision of the Manchester undertaking to recover nearly seven tons of aluminium by taking up 1½ miles of cable which was laid during the last war when copper shortage was acute. The need for more and more aluminium is at the back of new plans for the construction of generating stations in the United States, and most of the $25 million to be allocated to steam and hydro plant under the Federal national defence programme (nearly 40 per cent. of the total expenditure proposed) will be used for aluminium production. Otherwise it is officially estimated the amount of metal available by July, 1942, would fall short of that required by 60 million lb.—enough for the construction of 6,000 warplanes. On a basis of 10 to 12 kWh per lb., the maximum demand would be about 80,000 kW for that purpose alone. By the same date the Bonneville scheme, the western half of which has recently gone into commission at 115 kV (to be 230 kV ultimately), will deliver a further 60,000 kW to an aluminium plant near Vancouver. A 30,000-kW high-head water power station that is being built at Nantakala (Little Tennessee River) with the same end in view is also expected to be completed by that time.

Radio Interference Suppression

WITH the issue of one new and one revised B.S. Specification regarding methods of suppressing interference with radio reception, the number of such Specifications is brought up to six—probably the most comprehensive series of standards issued in any country. The new No. 905 prescribes the general conditions to be complied with in the design of receiving equipment, giving guidance on methods of its installation together with interference-suppression devices. This may be useful to users as well as to designers in helping them to eliminate interference emanating from sources beyond their control, and should be studied in conjunction with G. W. Ingram's "Radio Interference Suppression." The revised B.S.S. No. 613 deals with components, excluding marine uses, which is to form the subject of a separate publication, and traction applications. Its value is appreciably enhanced by two new appendices relating to shock and earth leakage and to wiring and maintenance. While the introduction of statutory measures to secure a reduction in radio interference may not be practicable at the present time, its probability as soon as circumstances permit should not be lost sight of.

Standard Terminology

IT is far more than academic propriety that makes it desirable to employ the same terms to mean the same things, and many mishaps of a more or less serious kind are due to differences in methods of expression. Thus, the work of the International Electrotechnical Committee (No. 22) on Electronic Devices has been greatly hampered by the confusion that exists in terminology in regard to rectifiers, and the letter we print this week from Mr. A. U. Lamm, Swedish delegate on that Committee, makes a useful contribution to the attempts to get the position straightened out. Incidentally, the dates given in the communication well illustrate the difficulties of communication between engineers in those countries which prefer to settle contentious matters on a basis of discussion of all rational points of view, with the object of securing a lasting settlement.

Salvaged Tramways

IN opening the Salvage Exhibition at Charing Cross Underground station last week, the Minister of Supply (Mr. Herbert Morrison) was able to report excellent results since the opening of the Salvage Campaign about four weeks ago. Among other things, he mentioned that 10,000 tons of tramlines had been recovered and that municipal authorities had scheduled a further 30,000 tons for removal. While from the electrical industry's point of view this indication of the decline of the tram is saddening, it is something to know that upon its departure it has bequeathed much valuable material to the nation. And we must always remember that in many cases the trolley-bus has taken its place though not in so many cases as we could wish.

Reliability of Supply

A CONSUMER on the AC mains in New York has to wait 500 years for his lights to go out. That is the picturesque form in which the Consolidated Edison Co. states that last year less than two in every thousand of its AC consumers experienced a service interruption. Although the equivalent capital expenditure on AC distribution is given as only 75 per cent. of that required for the Company's DC system and the operating and maintenance costs as only 60 per cent., failures for DC consumers numbered six per thousand. These are excellent results, though no doubt they are equalled or improved upon by many undertakings in this country. In the outlying districts of New York with AC radial overhead distributors, costing no more than 20 per cent. of the underground network for the same load density, an interruption may be expected every three or four years. This is evidently not considered good enough, and thirty or forty years is aimed at. This way of putting it might be useful when contravening ill-informed statements regarding the reliability of electric service.

Secret Signals

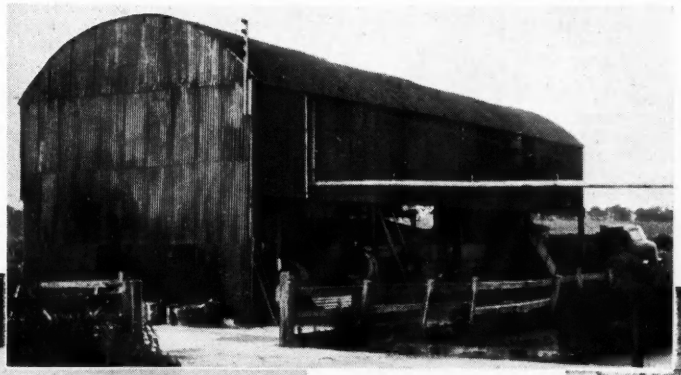
WHILE the use of ultra-violet light in signalling is not new, its practical utility for the purpose should be considerably increased by the extension of range made possible by a new type of lens reported to have been developed by Dr. M. Luckiesh. The lens, which permits the passage of ultra-violet rays only, is set in a telescope, which picks them up from any discharge point. The intrinsic value of such signals is that they are exceedingly difficult to intercept, and the telescope would probably find a sphere of usefulness in transmitting invisible signals during the night between ships in convoy.

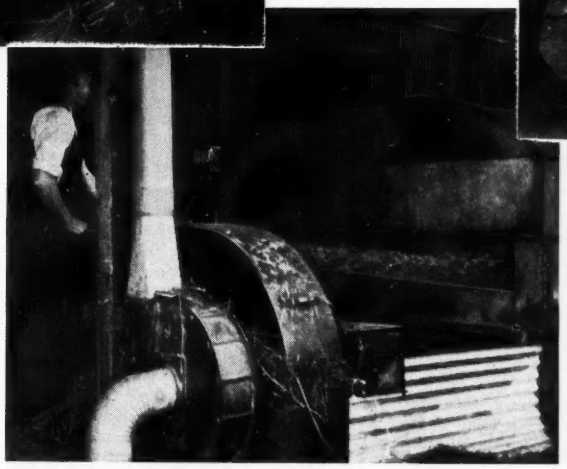
CROP DRYING

Increasing Use of Electrical Methods in Norfolk

A RECENT agricultural development of electricity, which is finding particular favour in Norfolk, is of especial importance in wartime in view of the necessity for making the most profitable and economic use of the country's home-produced foodstuffs for man and beast, as well as for saving labour. Crop drying by electrical methods is, in fact, now employed on fourteen farms in the county, the large size of the farms there rendering them eminently suitable for such mechanical aids. Even in cases where the extent of the farms does not justify the investment in a dryer, many farmers are taking advantage of facilities offered by their more fortunate brethren to treat their crops.

At all events, once they are installed, the dryers are rarely idle for a minute thoughout the day from the end of April to September or October, and in some cases where the plant can be illuminated and suitably blacked-out, they are run all night too. Besides dealing with threshed corn, the apparatus can, with slight modification, be used for drying grass, clover, lucerne, &c. A typical installation, which Mr. G. H. Bowles, sales manager of the East Anglian Electric Supply Co., Ltd., took us to see recently was, in fact, engaged in the drying of grass.





A general view of the electric crop-drying installation at Hall Farm, Babingley, showing (left) the feeding of the grass on to the elevator, (below) raking the dried grass into the hammer mill and (right) sacking the ground meal

This was at Mr. W. Parker's Hall Farm at Babingley, where a Ransomes, Sims & Jeffries plant runs continuously from 4 a.m. to 10 p.m. to produce an output of 4-5 cwt. of dried meal an hour. This dried meal, which retains its green colour and a very large proportion of chlorophyll, has a very high nutrition value and only a small quantity used in conjunction with bulk food provides a most satisfactory winter diet for live stock. In fact its pleasant appearance made us wonder whether there were not possibilities for its use for human consumption. Actually the value of dried grass sprinkled on sandwiches as human food was mentioned by Lord Woolton, the Minister of Food, a week or two ago. He said that American scientists claimed that dried grass contained practically all the vitamins anybody wanted. He himself had a whole set of recipes which he had given to his wife.

The cut grass is first loaded on to an elevator, care being taken to see that this is done evenly. The elevator is geared to run at the same speed as the horizontal conveyor on to which it feeds. The grass is then dried in three stages by passing it along a 41 ft. long by 17 ft. 6 in. wide conveyor through air of different temperatures. The actual temperatures used depend on the type of crop, but for the grass being treated when we inspected the plant they were approximately 300 deg. F., 200 deg. F., and outside air temperature, in the three successive compartments. The hot air is blown under the conveyor and through the grass by means of two large fans driven by a 20-HP motor, the installation being thermostatically controlled throughout. Although the air is heated by a coal furnace, this is fed electrically by an automatic stoker operated by a 2½-HP motor, a time switch being employed to raise the temperature to the required level in preparation for starting operations first thing in the morning.

When the grass reaches the end of the conveyor—a process which takes about twenty minutes—some 90 per cent. of its moisture content has been removed. Of course, if the grass is wet the process takes rather longer, sometimes as much as half an hour, but the rate of travel of the conveyor can be adjusted to suit day to day conditions. It is then raked off into a hammer mill driven by a 25-HP motor whence it is blown in powder form through tubing to the packing shed. Here a cyclone dust extractor separates the dust, which is especially nutritive and fetches a higher price than the coarser product, and both qualities are fed directly into sacks and weighed.

For the whole process only three men are required—for feeding the elevator, raking the dried grass from the conveyor into the hammer mill, and filling and weighing the sacks. The plant itself is fully automatic and needs only periodical attention. As this particular installation has been in use only for a short period the average costs over a whole season are not yet available. During a fortnight's operation, however, when the plant was in use for 108 hours each week the consumption was 3,000 kWh for the period. The average output of grass was 3½ cwt. per hour, whilst the average consumption of electricity was just under 14 kWh per hour, or 4 kWh per cwt. of grass dried, including grinding.

(*Concluded at foot of next page.*)

ELECTRICITY IN ONTARIO

Contribution to the War Effort

THE latest annual report of the Hydro-electric Power Commission of Ontario, covering the fiscal year ended October 31st, 1939, includes only a short period of war. This was sufficient, however, to indicate that the increasing industrial activity which had been noticeable for some months prior to the outbreak of hostilities was being augmented as plants manufacturing war materials gradually expanded their production, with a resulting growth in the power load.

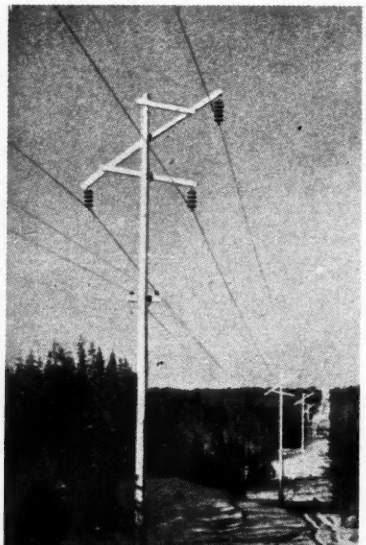
In a foreword to the report Dr. T. H. Hogg, chairman and chief engineer of the Commission, shows that there are three main fields in which additional hydro-electric power can be used to expedite the production of war materials—in the mining areas of Northern Ontario, in the manufacturing industries of the South, and in the electro-chemical and electro-metallurgical industries. The production of nickel and copper, important war metals, has increased greatly in Northern Ontario in recent years, while the spectacular growth in the amount of gold mined in the province has also been largely fostered by the cheap hydro-electric service provided by the Commission, and a substantial contribution is thus being made to the Dominion's financial strength. Progress in the mining field during recent years is described as phenomenal, the total peak load of Northern Ontario Properties rising in the past four years by more than 100,000 HP to 168,000 HP, or by over 150 per cent.

The reserves of hydro-electric power in Northern Ontario are sufficient for normal expansion for two years, and there are also many sites which lend themselves readily to development. In regard to the manufacturing industries of the South, the contract provisions made for increased supplies of purchased power for the period 1940 to 1944, aggregating 140,000 HP, can be advanced if necessary. In the electro-chemical and electro-metallurgical fields the Commission is in a position to meet large demands without increasing its system capacity. Indeed, for the immediate future it may be said that there is ample power available in all districts to enable Ontario's war effort to be speeded up and maintained at a greatly enhanced level.

To meet present conditions important new powers have been conferred upon the Commission by a recent Act passed by the Provincial Legislature, which gives the Commission authority to regulate and control the generation, transformation, transmission, distribution, supply and use of all power in the province.

Another step taken is the strengthening of weak links in the Commission's extensive transmission systems by the construction of two or three strategic interconnecting and transmission lines. Surveys are also being undertaken in order to anticipate any exceptional demands and to ensure that all plants working on munitions may be guaranteed an adequate and reliable power service.

Throughout the year under review operating conditions were most favourable, unlike in the previous year when an ice jam on the Niagara resulted in the Ontario plant being completely put out of action and also curtailed the output of the Queenston plant. Among the works carried out during the year was the interconnection of the Patricia and St. Joseph districts of Northern Ontario Properties (which obtain their supplies from the Ear Falls and Rat Rapids plants) by a transmission line extending from Uchi to Crow River, a distance of 113 miles. This line, part of which is shown in the accompanying illustration, enables the two plants to be operated in parallel. This carries a stage further the plan for welding the transmission systems of the area into one physical entity.



Section of the Uchi to Crow River 66-kV transmission line, showing the typical wishbone poles

Although the output in the early part of the fiscal year was affected by the 1938 business recession, the total for the year was the largest on record, amounting to 8,502 million kWh, an increase of 12.1 per cent. on the previous year. The output for primary power purposes was 6,576 million kWh, an increase of 7.4 per cent., and the primary peak load rose by 12.4 per cent. to 1,669,337 HP. It should be explained that the primary load is distinguished from the total load in that it excludes secondary power supplied only as and when available, and is, therefore, of greater significance in relation to revenue and general industrial conditions than the total load.

Applications for rural service last year equalled the annual records established in the two preceding years, and approval was given for the construction of 2,300 miles of rural primary lines to serve more than 13,000 additional consumers. It is anticipated that the demand will continue on a similar scale during the current year and that much new territory will be covered. The aggregate rural peak load last year was 61,634 HP, an increase of 15.5 per cent. There are 184 operating rural power districts and power is delivered to approximately 113,000 rural consumers, comprising farms and dwellings in various groups, served by 18,166 miles of primary lines. There are approximately 200,000 farms in the province, but many of them are situated in remote districts. When regulations were in force requiring three farm contracts per mile of primary line (since reduced to two) it was estimated that 75,000 standard or large farms would be the maximum that could be served.

The Commission's financial statistics are divided into two sections, one relating to Northern Ontario Properties, which are operated by the Commission, and the other to the co-operative municipal systems (Niagara, Georgian Bay, Eastern Ontario and Thunder Bay) together with the Manitoulin, Nipissing and Sudbury rural power districts. The revenue of the former amounted to $4,181,201, an increase of 23 per cent., the expenditure rising by 10 per cent. to $2,143,036. After provision for reserves ($1,658,862) there was a net surplus of $379,303. In regard to the co-operative systems, the basic principle is that electrical service shall be given by the Commission to the municipalities and by them to the ultimate consumers at cost. During the past year there was an increase of about $2,000,000 in revenue, which amounted to $28,503,339. In addition $4,196,088 was received from rural power districts, making $32,639,427. Expenditure amounted to $26,713,270, and $5,660,015 was set aside for reserves, leaving a balance of $266,142.

Crop Drying (*Concluded*)

On other farms where the plants have been in operation longer, statistics without exception show substantial savings resulting from using electricity instead of tractors for providing the driving power for the dryers. Last season, for instance, Mr. W. Newcome-Baker, of Wethered Farm, Sedgeford, who grows on an average 500 to 600 acres of corn a year, found that the electricity consumption worked out at 12 kWh for 10 sacks, which, with energy at 2d. per kWh is 2s. 4d. per sack. Mr. Newcome-Baker stated that the lowest cost to run a farm tractor for this purpose was 2s. 11d. per hour including depreciation. His plant has a capacity of 10 sacks an hour and runs day and night for 6 to 8 weeks, utilising 9,000-10,000 kWh of electricity, and representing an installed load of just over 15 kW.

Satisfaction at the cost and convenience of electrical methods is also expressed by Mr. M. Wheatley, of Bluestone Farm, North Creake, who comments that the stationary lorry engine previously used was a continual source of anxiety, while Mr. Hinds, manager of Hall Farm, Houghton, points out that no attendant is required with electrical operation, which is also very quiet compared with the operation of stationary engines.

This question of noise is an important one, especially when the plant is run continuously day and night, including Sundays, as is the case at Mr. R. F. Pull's Cliff Farm, Old Hunstanton. Moreover, Mr. Pull says that the wear and tear of the tractor used previously was very considerable and that difficulty was experienced in keeping the engine from over-heating. No attention is required for the electric motor, which has the added advantage of ensuring that the fans run at a constant speed, and wear and tear is negligible. Mr. Pull also declares that the employment of a combine and dryer saves at least ten men.

Incidentally, a very noticeable increase has occurred in the use of combines in the county. In nearly every case where these are employed it is necessary for the corn to be put through a dryer. This fact, coupled with the shortage of skilled farm labour, appears to point to an opportunity for an increased use of electric dryers, as well as many other electrical aids on the farm. The load is obviously one that should be cultivated by electricity supply authorities, not only in view of the fact that it is entirely a summer one, but also of its high load factor.

I.E.E. WIRING REGULATIONS

Comments on Section 10 of the Eleventh Edition

By T. C. Gilbert, A.M.I.E.E.

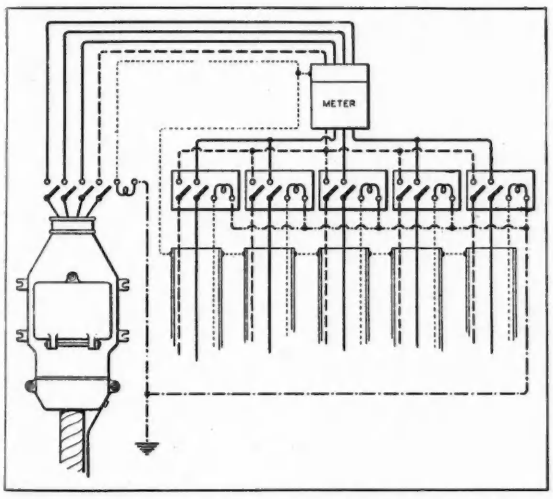
THE Eleventh Edition of the I.E.E. Wiring Regulations, and its amendments, has been with us sufficiently long for the commentators to have completed their observations and for the expounders to have surpassed the compilers in the gentle art of concealing the real requirements. In no section is this fell work so complete and confusing as in that dealing with earthing requirements, probably the one section that should be clarified to the *n*th degree. The first slight fog now having settled down to an impenetrable night, the following further comments can do no more harm.

The introduction of special legislation for earth-free situations is a welcome breakaway from tradition, and it is hoped that further exemptions will follow in later editions. It has been conceded that shocks may be received from apparatus with exposed elements, unnecessarily earthed, and the logical extension of the no-earth rule must follow for surface-type switches with plain screw-off covers, lest the householder get a shock when adjusting the multiple-store switch.

Regulation 1006 provides the real snags, however, and I have not yet succeeded in unravelling its requirements. The marginal title "Earth-Leakage Protection," is surely too wide, as it must include insulation; the words "live conductors" create ambiguity, for although we conclude that phase conductors are meant—see definitions—yet in the rural area the neutral is often a live conductor within the meaning of one other definition. The necessary earth-leakage protection must disconnect these live conductors, however, when the leakage potential exceeds 40 V; would not a better title be "Earth-Leakage Isolation"?

Leakage Trip Complication

It will be gathered that a voltage-operated earth-leakage circuit-breaker—later referred to as an e.l.c.b.—is called for in every installation, and it may be an automatic device incorporated with excess-current protective devices. The two functions combined under one cover would probably be referred to as a "circuit-breaker," in the loose manner of the trade, and the first complication arises when it is found that an alternative device "responsive to leakage currents between such metal and earth" is permitted, i.e., another circuit-breaker with a current-operated trip. That is to say, if the overload setting of such a circuit-breaker were 100 A and the characteristics of the circuit such that no heavier leakage current than 50 A could ever be expected, then the addition of a leakage trip responsive to, say 40 A would meet the requirement. I have so read the Regulation, but find very little



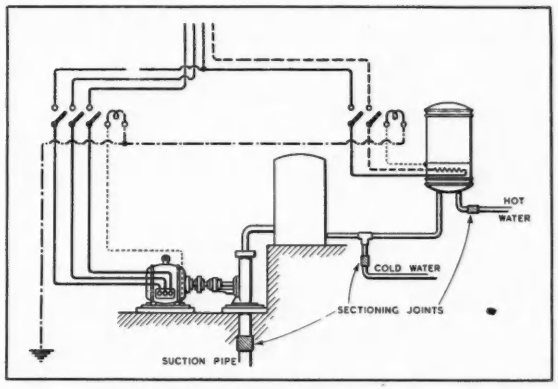
Multiple earth-leakage circuit-breakers installed with insulated tubes with light metal coverings

agreement with my view; both forms of circuit-breaker are, in the last resort, current-operated.

Recently in the Press a member of the Wiring Regulations Committee has stated that the main use of a trip responsive to leakage current is in conjunction with three-phase circuit-breakers where the trip is actuated on the principle of a balanced core. As such devices are rarely used in the type of buildings that are subject to the application of the Eleventh Edition it will surely clear the air if in future editions all reference to current-operated alternatives is dropped and we are left to our voltage-operated devices.

There are certain exemptions to this voltage limitation; the first is in those circuits where the maximum possible earth-leakage current can be proved to be greater than the overload value at which the fuse or circuit-breaker is set to operate. Although the maximum possible earth current can always be easily calculated, should we not rather deal with the maximum probable leakage current? For instance, in installing a motor it is no great feat to say that the heaviest earth-leakage current will be the resistance of the earth-continuity conductor and electrode, say one ohm, divided into the supply voltage, and we shall get a result something like 230 A. If the fuse rating is 25 A, we are exempt under Regulation 1006 from the necessity to install earth-leakage protection—whatever that may be.

The earth fault, however, may take place in the middle of one of the phase windings, completely upsetting these involved



Simple earth circuit with likely earth contacts sectionised to ensure selective operation

calculations by amounting to no more than 20 A; the earth continuity conductors get hot, the workshop catches fire, but the Regulations have been faithfully observed. It is suggested that the lowest possible earth-leakage current is the one to budget for, as is clearly shown in recent Home Office publications, although it still remains necessary to differentiate between normal leakages and faults. Cooker hot-plates, for instance, pass many milliamperes to earth all day long, but these leakages are not usually considered to be faults, however much the supply authority would frown upon them if coming from the wiring.

Spreading of Leakage Currents

Regulation 1002 still requires the bonding of electrical and non-electrical metal in any room containing a fixed bath, which ensures beyond doubt that leakage is extended to all other metal in its passage to earth. From this it may be safely assumed that any current-operated leakage trip would receive only a fraction of the leakage current. Even without this definite mechanical connection between electrical and non-electrical metal, current transfers take place between conduits and other metal all over the installation, as a "Megger" reading between conduit and earth will reveal.

In any realist examination of the problem, the first assumption must be that electrical leakage cannot possibly be confined to the uninsulated earth-continuity conductor, but reaches Mother Earth by devious paths and many good and semi-conductors. The average building is a mass of earth-connected metal, while concrete floors and walls provide the necessary connection between this and the network of steel conduits; a leakage of any magnitude arrives at zero earth in extremely small parcels, larger at some points of low resistance, smaller at others. It seems clear to me that effective leakage protection can only be applied by the limitation of the voltage of this mass leakage, since the resistance of the leakage path is a variable and unknown quantity.

If it be conceded that leakage potential is set up by these multiple-current leakages, in the event of fault, and that the interests of safety require such potential to be limited to 40 V, then we must criticise the second paragraph of the Note to Regulation 1006. This indicates that if there is a risk of the tripping solenoid of the e.l.c.b. being short-circuited owing to contact intentional (as in 1002) or fortuitous (as in every installation) with extraneous metal, then the solenoid should be connected by means of an insulated conductor to an earth electrode remote from any such extraneous metal referred to and also remote from the main earth electrode. I would submit that such contact, of low or high resistance according to the construction of the building, exists in every installation.

and that the separate electrode must therefore be provided for every installation.

We have been for so long accustomed to look upon the main water pipe and the continuous underground cable sheath as good electrodes that it comes as a shock to find that they are, as far as e.l.c.b's. of the voltage-operated variety are concerned, electrodes to be avoided if effective voltage limitation is desired. If non-electrical metal in any building shares in any electrical leakage potential, the tripping solenoid must not on any account be connected to any portion of such non-electrical metal as an earth electrode, but some other electrode must be found. This is an extremely simple matter, as an ordinary driven spike will serve admirably, but it should not be driven too near the entry of the main water pipe or the cable sheath into the ground; this must be done in every case where voltage-operated earth-leakage circuit-breakers are used.

Although this may sound rank heresy, it is a point easily proved. The two examples of the use of these devices illustrated in the accompanying diagrams are taken from Continental experience. Although in the one case a cable sheath is available, to which the service cut-out is bonded, yet a separate electrode is used for the e.l.c.b's. In the second case a water pipe is available, but far from being used it is rendered non-conductive to some extent by the insertion of an insulating section.

This appears the only logical arrangement for any system of voltage-operated leakage protection, but apparently the Wiring Regulations Committee thought otherwise, and their opinion is supported from another source. Appendix D of B.S.S. 842/1939, says: "If water mains are available and are of a satisfactory nature for the purpose, they may be used as an earth connection for earth-leakage circuit breakers." This is clearly counter to practice on the Continent where, in some areas, they have been installed under compulsion for the past twenty years.

Rise of Resistance

A further breakaway from current thought in connection with earth-leakage protection is desirable regarding requirements for conductance of steel conduits and lead sheaths. By reason of the multiple-earth contacts with uninsulated earth-continuity conductors, as argued above, the securing of a low-resistance reading may be a delusion and a snare. Although the requisite one ohm may be indicated when an installation is first made, and the building damp, yet the passage of time is almost always accompanied by a rise in this resistance with the drying out of the building.

Evidence on this point is available from recent Home Office publications, as a result of which the E.R.A. is investigating the matter of conduit-joint conductivity. If the fact is not as well known as it should be, this may be due to the infrequency of continuity resistance tests once the installation is completed and connected. Messrs. Marryat's house journal, the *Engineering Gazette*, records a series of tests of conduit continuity of installations that had been in use from one to three years only; it was found that resistances as high as 30 ohms were obtained.

My experience is that earth continuity-conductor resistance cannot be maintained at one ohm for any length of time if this conductor is made up of steel conduits or lead sheaths, with their many and differing junctions. The case is, of course, different where copper conductors are used for this purpose, but the requirements of the Regulations are stated in connection with conduits and lead sheaths, an excellent example of wishful thinking coupled with tradition. If after the lapse of years the instruments still register one ohm or less, this is as likely to be due to contacts between the conduits and extraneous metal as to excellence of the joints and the installation.

It is therefore suggested that in future editions of the Regulations all reference to leakage protection by means of current-operated devices should be eliminated, unless the earth-continuity conductor is of copper or good conductivity material and is connected to a main water pipe at the proper point. It should be clear that with all the incalculable resistances in the continuity conductor, coupled with further resistance at artificial electrodes, and the varying maximum leakage currents that can flow, depending in their turn upon fuse rating, the only logical form of efficient leakage protection must be that associated with the limitation of the leakage potential. The present edition demands this already, but immediately confuses the issue by making reference to equivalent current-operated devices, which are intended to limit any leakage potential to 40 V. How can this possibly be done in practice? Do some engineers still consider the voltage-operated e.l.c.b. to be actuated by the leakage current flowing between protected metal and the earth electrode?

Further, in all cases where voltage-operated e.l.c.b's. are used or installed, it should be mandatory for a separate electrode of any simple type to be utilised; all connections to water pipes or cable sheaths, however attractive they may appear, should be forbidden. It is only by this means that the voltage-operated earth-leakage circuit-breaker is enabled to perform in a logical manner its protective function, which is the isolation of leakage potentials as soon as they exceed a safe low limit, wherever these potentials may appear, and irrespective of the fact that they may be on non-electrical metal.

Leakage protection can only mean protection against leakage. It should not be construed to mean leakage from electrical metal alone.

Reducing Sales Costs

By Showroom Manager

IT has been impressed upon us that we must only spend our money on absolute necessities and invest our savings in Government loans. The question is what is an absolute necessity? Electric cookers, kettles and irons can probably be classed as necessities and a salesman might argue that refrigerators, fires and fans are necessities. Electricity itself is very much a necessity, and therefore we salesmen can carry out our work in the sure knowledge that we are working with the Government. One thing, however, we must do and that is to reduce our sales costs.

If we are to economise and at the same time ensure that the public appreciate the advantages of electricity we must make fuller use of our existing contacts with our consumers. Our meter readers can become effective ambassadors. A few undertakings advertise on the backs of their accounts, and this effective form of publicity might be expanded.

Displays and Packing

Window displays become more important, and savings can be effected by cutting out elaborate backgrounds and adopting the open type of display. Savings can also be effected in packing appliances. Electric irons, kettles and so forth are usually delivered by the manufacturer in a carton, and there is really no necessity for this to be wrapped before delivery. Presumably the manufacturers will be forced to cut out the elaborate packing supplied with many appliances, in which case we may find that our paper and string bills will be larger than in peace time. However, as things are to-day we should be able to economise on packing.

Showroom staffs will avoid criticism if they make certain that electrical appliances, such as illuminated electric fires, are used only when strictly necessary. This particularly applies to municipal showrooms, and the salesman in a municipal showroom will do well to pay particular attention to the importance of economising in every direction, otherwise he is throwing himself open to criticism. Supply undertakings' sales costs are not the only sales costs that have to be reduced. Manufacturers and wholesalers will be forced to make drastic reductions. The new purchase tax is going to create some difficult problems. Some supply undertakings act as wholesalers to contractors and they are also going to feel the pinch.

Manufacturers might use this opportunity of reducing their costs by simplifying the design of some of their appliances. There was a trend in this direction some time ago, but then manufacturers commenced to vie with each other in producing more elaborate appliances. This was surely a mistake which war conditions will undoubtedly rectify. As a salesman, one cannot help hoping that war conditions will not bring about a standardisation in the design of appliances. The majority of our customers are women, and women have never been fond of standardisation.

Perhaps the electricity supply industry has of recent years tended to adopt a very luxurious method of selling. We have had elaborate showrooms, magnificent demonstration theatres, expensive booklets and costly window displays. War conditions have made the pendulum swing from elaborate sales methods to no selling at all. This is obviously wrong. Efficient salesmanship is essential in wartime, and all salesmen need do is to adopt less elaborate and more practical methods. We want simplicity in displays and publicity and sincerity in sales methods, which will ensure a reduction in sales costs, and more efficient and more economical salesmanship.

Carbon-black Cables

ACCORDING to a message from *Reuter's Trade Service*, the Anaconda Wire and Cable Co. has completed the development of carbon-black cable, a high voltage, paper-impregnated, lead-sheathed cable, and is now manufacturing it on a regular production scale. Reports from the company's engineers indicate that in severe cyclic loading and ageing tests, simulating actual operating conditions, this new cable lasted more than twice as long as standard shielded cable and during the test period, which listed 435 days, showed extraordinary overall stability. This improvement in paper-impregnated cable has long been expected since the beneficial effect of carbon-black on insulating oils is common knowledge. It was a matter of finding a method of application. Now that it has been found, it is expected that the application of carbon black will be extended beyond solid-type constructions to oil-filled and gas-pressure cable as well.

ELECTRICAL PHOTO-ENGRAVING

A Fresh Phase of Facsimile Reproduction for Newspaper Printing

By T. Thorne Baker

STUDY of the literature of early telegraphic transmission of pictures reveals that the minds of inventors were directed long ago towards the possibilities of receiving a telegraphed image direct upon a soft metal sheet, a cutting tool (operated electro-magnetically by the receiving currents) making an intaglio image which could be forthwith printed. Recent literature indicates that some fresh attention has been devoted to this timeworn problem, but the consensus of opinion to-day is that it is more profitable to transmit a continuous tone image from which the screen picture for reproduction can be made by the ordinary methods.

It has become established, however, that by transmitting a picture by photo-electric scanning to another cylinder rigidly attached to the scanning cylinder, a new means has been established of reproducing photographs, eliminating the camera. This technique has opened up a most important field which is likely to have far-reaching effects upon the photo-engraving industry. It applies equally to black and white work and colour, and offers for the first time in photographic reproduction history a means of producing almost perfect copies of any original with little of the retouching and "fine-etching" which to-day make photo-engraving unnecessarily costly.

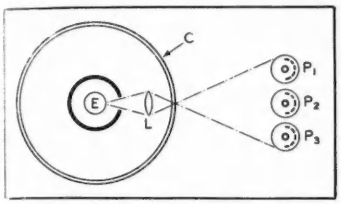


Fig. 1.—Glass engraving drum and photo-electric cells

The general methods of facsimile reproduction are well known. The original photograph is attached to the cylinder or drum of the sending instrument and the surface is scanned by a beam of light which is made to trace a spiral path round the drum, the light, after absorption by the picture tones, being reflected back on to a photo-cell. The amplified output currents from the cell are transmitted to the distant receiving instrument, where they are used to operate a light "valve" which exposes a sensitive film, or to make an electro-magnetically actuated stencil mark the paper through a sheet of ordinary carbon paper. An alternative is to use the received currents to operate a high potential glow lamp, the rays from which are concentrated through a tiny aperture upon the surface of the sensitive paper.

In all transmissions over a distance the synchronisation of the sending and receiving drums and the need for very high amplification of the photo-cell currents and often of the received signals introduce conditions which affect the perfection of the facsimile image. In the case being described, in which both drums are on one shaft and driven by the one motor, quality of reproduction is much more easy to control.

Recent sensitometric investigations have indicated the exact losses in tone rendering when making half-tone reproductions by ordinary methods of photo-engraving, in both the high-lights and shadows of the image. These are overcome in the ordinary way by retouching of the original, skilled manipulation of the negative, and fine-etching of the metal block. It is possible, however to bias the currents from the scanning unit so as to put back, as it were, what is lost in photo-mechanical reproduction processes. Selecting suitable portions of the characteristic curves of the valves used in amplification, and using the photo-cells themselves under selected conditions, makes it possible to add to or take away from the tones of the facsimile image at any desired densities.

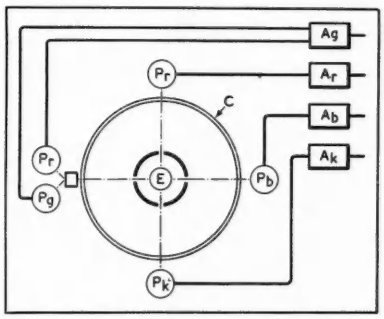


Fig. 2.—Scanning cylinder with light-sensitive cells

One method of obtaining this result is embodied in a newspaper engraving unit made by me for a provincial American newspaper. A transparent film is attached to a drum, actually a glass cylinder (C, fig. 1), and light from a lamp E is focused by a lens L so that the rays cross on the periphery of the cylinder. The light beam, after passing through the photographic original, is spread by a negative lens (not shown) so as to fall on three photo-cells, P_1, P_2 and P_3. Cell P_2 gives a straight-line reproduction of the image over most of the middle tones. Cell P_1 is so arranged electrically that it records the high-light tones only, and adds density to the upper part of the reproduction curve in the manner indicated by Tritton and Wilson in the *Photographic Journal*, June, 1939. Cell P_3 similarly adds densities in the shadows. The currents from the three cells, after amplification, are mixed and made to operate a glow lamp, the rays from which expose the receiving film. In this way a biased reproduction is obtained which, when resolved by the half-tone screen in the process camera, yields a half-tone negative from which a block can be made that will give "perfect" tone rendering without hand work.

Making Four-colour Plates

The primary purpose of the system is to speed up the making of half-tones for newspaper printing. The *Trenton Times* (New Jersey, U.S.A.), which has adopted the system, prints high-speed offset lithographic four-colour pictures with 120-line screen at 45,000 copies per hour, something at present unique in newspaper printing. For speeding up the making of the four-colour plates a colour transparency is mounted on the scanning cylinder of the facsimile apparatus (fig. 2). Light from an interior lamphouse passes through four windows arranged at 90 degrees with each other, and the rays are focused on the periphery at four points. Caesium-oxide cells respond to the red and infra-red elements of the picture, P_r and P_k respectively; P_b responds to the blue elements, and a caesium-magnesium photo cell P_g picks up the green elements.

Each cell is provided with the requisite coloured filter. In the case of the green scanner there are two cells. This is to enable the green-sensation negative (the red printer) to be "masked" by the super-imposition of a light red-sensation image, in the manner now largely adopted in three-colour work, the combined images having the same density range as the other three, but immensely improving the colour rendering. The five cylinders (scanning, red printer, yellow printer, blue printer and "key printer" receiving drums) are arranged as shown in fig. 3, all directly coupled and driven from one motor and mounted in bearings attached to a rigid cast-iron bedplate. The amplifying circuit used for the photo-cells (fig. 4) permits positives or negatives to be prepared at will merely by reversing the polarity of the high voltage applied to the glow lamp. The four negatives are made simultaneously in six minutes, in 10 by 8 inch size, and are so photographically biased that printing plates can be rushed from them and be on the press in a greatly lessened time.

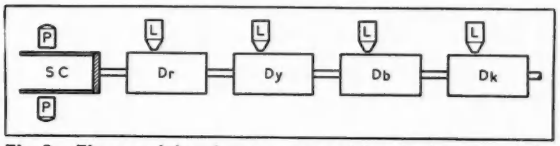


Fig. 3.—Five receiving drums arranged for single motor drive

Ample Reserve in Montreal

BECAUSE it has been a basic policy of Montreal Light, Heat & Power Consolidated, since its inception, to be ready for any emergency demand for gas and electricity, the company not only is meeting easily the present gas and electricity requirements in the Montreal area, but is in a position to provide whatever supplies may be needed in connection with production of vast quantities of war materials. Mr. John S. Norris, president of the company, recently said:—"As Canada launches its maximum effort to repel the threat against the British Commonwealth of Nations its industrial and economic strength, which may turn the tide, hinges in a large measure on its power industry, which will be called upon to provide efficiently for the sudden and heavier demands. Your company is prepared to do its part and is meeting every demand for any future emergency. Already your company's power load has risen to some 800,000 HP, the highest load in its history. Much more power will be required before the end of the year. Due to careful planning your company could meet quickly a demand for even 1,000,000 HP, and new developments, now under way, will be adding constantly to available reserves."

Correspondence

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

Rectifier Nomenclature

I HAVE read with great interest Mr. H. Rissik's letter in your issue of December 29th last. I quite agree with his view that there is a strong need for a standard nomenclature in the rectifier field and especially for one that can be applied internationally.

There have appeared different suggestions on this subject before, especially from Switzerland and America. It seems, however, that a certain confusion has been provoked by a clear distinction not having been made between the electronic device itself on one hand and the whole converting aggregate on the other. It is so much the more important to make that distinction as the electronic device itself is often identical in a rectifier and an invertor and sometimes even in a frequency convertor. It is in such cases only the special combination of the transformer, inductance coils, condensers and grid control, &c., together with the electronic device, that constitutes the special kind of converting unit, and it is therefore meaningless to refer the differentiated terms to the electronic device.

In my opinion this is one of the reasons why the Swiss proposal of the term "mutator" has not met with the success anticipated by its originators. They have tried on one hand to apply that word to the electronic device itself and on the other, by adding certain prefixes, to use it for specifying different kinds of "convertors." Another reason is that the combination terms thus created have been too long and complicated to use. When a new term is quite freely invented like this one, we have good reason to claim that it shall be short and simple to use.

Thus, according to my view, the new term looked for ought to apply to the whole group, i.e., the electronic device with its transformer, &c. For this term I would suggest the word "vertor" as the general expression. The special devices would then be named as follows:—Convertor, AC to DC; invertor, DC to AC; frequency vertor (revertor?), AC to AC; DC vertor (devertor?), DC to DC.

The electronic device itself could be generally termed "current valve," or possibly "mutator." There are many different kinds, such as electronic valves, ionic valves (e.g., mercury-arc valves), metal-plate valves and (why not?), mechanical (rotating or oscillating) current valves. From the electrical point of view all of them act simply as valves or switching devices for the current. It is, generally speaking, primarily when combined with other apparatus in a group that they change electrical energy from one form into another.

A. U. LAMM.

Ludvika, Sweden, *June 5th.*

Stimulating Trade with New Zealand

In the commercial and technical department of the Central Public Library, Wellington, New Zealand, we have, thanks to the co-operation of many manufacturers, an extensive collection of trade catalogues. The object of this collection is to bring together the buyers and sellers of goods and manufactures.

I should be most grateful if you would publish a note stating that this library would be pleased to receive copies of trade catalogues as they are issued. These should be addressed to the City Librarian, Central Library, P.O. Box 1529, Wellington, C.1, New Zealand, and their receipt will be acknowledged. Packets should be marked "Printed Matter Only" and forwarded as second-class mail.

JOS. NORRIE,
City Librarian.

Wellington, *June 17th.*

Electric Gas Lighters

Referring to Mr. Rollo Appleyard's and Mr. Tubbs' recent letters in the REVIEW, I have in my possession a complete Clarke's lighter, engraved "Clarke's Patent 5992-6313."

Many years ago it operated successfully, and at the present time the quadrant mechanism and rotor are in perfect condition; the brushes and foil strips, however, are destroyed. Some information relative to their arrangement would be of interest. The lighter was efficient, and I can see no reason why the principle should not be redeveloped for modern use.

A. JENNER LOVELL.

Manchester, *August 12th.*

Electric Shock Studies

THE Accident Prevention Committee of the Edison Electric Institute recently appointed a Resuscitation Review Board to make a study of cases of electric shock reported by members. The Committee has now circulated to utility undertakings a form upon which they can report details of cases occurring among their employees. This asks for details of all relevant circumstances including the physical condition of the victim, weather conditions, the kind of work on which he was engaged, description of circuit, method of contact, behaviour after the shock, particulars of resuscitation and description of injuries. The reverse of the form bears outlines of a human body and the utility is asked to indicate the path of the current and the position and extent of burns.

Priority and Co-ordination

Select Committee's Report

EXISTING arrangements to decide which orders placed with manufacturers should take precedence of others are criticised in the tenth report of the Select Committee on National Expenditure published last week (Stationery Office, 4d. net). The report is based on investigations made by the Co-ordinating Sub-committee which heard the views of Mr. Arthur Greenwood, who presides over the Production Council, and Col. J. J. Llewellin, who is in charge of the Central Priority Department and is chairman of the Materials and Production Priority Committee.

It is not considered that the existing central priority organisation fails to carry out the work for which it was designed, but that the conception of the problem is too limited. The responsibilities of the Central Priority Department cease after the allocations of materials and works capacity have been made; there is no centralised grading of products and each department is left to apply such pressure as it can to contractors to secure the completion of its own orders. Departments are often in competition and contractors receive contradictory instructions which they cannot carry out and "progressing" in factories is left with individual departments and is not linked up with the Central Priority Department. There is no one centralised organisation responsible for reviewing and minimising delays and deficiencies in the light, not of individual departmental needs, but of the armament programme as a whole.

An Over-riding Organisation

The Select Committee makes a number of recommendations. Chief among these is that an extra-departmental body is needed with powers to compel consuming departments, in cases where future difficulties of supply are foreseen, to modify their specifications or their quantitative requirements in advance of these difficulties and that full inter-departmental co-ordination must be established if any system is to work smoothly. An independent department comprising the priority organisation and the raw materials control should be set up with over-riding powers in the priority field. Priority directions should be drawn up for specified periods (preferably not less than three months) based on detailed planning of the supplies and needs of the war departments. A system of grading should be established immediately. If priority certificates are issued they should be granted independently to main contractors and sub-contractors.

There should be far closer affiliation between inspection and progressing. Departmental area progress officers should be appointed with local and general production knowledge to work as part of the Area Organisation and progress reports should be submitted simultaneously to the Area Organisation and the department. The whole Area Organisation should be expanded and unified on an inter-departmental basis; it should be fully responsible for all area work concerned with production, capacity, labour and transport and should co-ordinate and act upon decisions of the four Priority Committees.

Progress branches should be established in departments, which should work in close connection with the Principal Priority Officer and his staff; and progress inspectors with specialised knowledge should be appointed to work from departmental headquarters. The duties of these officers would be to inspect and accelerate the work on particular types of equipment, irrespective of area. Full inter-departmental control must be established throughout all stages from Cabinet direction to delivery to the user in order to eliminate competition and establish a national as opposed to a departmental outlook.

Since the report was written, the Committee has received a memorandum from the Ministry of Supply stating that the Area Boards have been re-constituted, the Area Organisation of the Ministry has been carefully reviewed, and Area Progress Officers, whose duties appear to be conceived on the lines recommended by the Committee, are now being appointed.

Saving by P.F. Correction

IN our issue of August 16th we dealt with the correction of power factor in industrial works, stressing the saving in time and money which could often be secured. The *Electrical World* reported in a recent issue an interesting example of this. It stated that capacitors installed in the plant of the Ferro Machine & Foundry Co., Cleveland, Ohio, increased the power factor to an average of 97 per cent. and reduced current on two overloaded feeders by 200 A, providing adequate feeder current-carrying capacity. The installation paid for itself in sixteen months.

With a plant load made up mainly of 220-V, three-phase induction motors driving air compressors, tumbling mills and other foundry machines, power factor was so low (about 67 per cent.) that an increase in conductor sizes on two feeder circuits appeared necessary. The load factor was about 70 per cent. A total of 600 kVA of dust-tight capacitors was connected in the system, half arranged in a switch-house on the 2,300-V side of the transformers and the rest at the ends of 220-V feeders in banks of 45 and 90 kVA.

NEW BOOKS

Power Station History. Fault Current Calculation. Television Manual

The Early Days of the Power Station Industry. By R. H. Parsons. Pp. 214; 24 plates and 5 diagrams. Cambridge University Press, Bentley House, 200, Euston Road, London, N.1; price 15s.

Most engineers who are acquainted with the history of electricity supply in England recognise that the process of power station development was extremely complicated and individualistic, and are content to leave it at that. Fortunately, a few of them recognise the exceptional interest of that history, and Mr. R. H. Parsons has rendered a service to British engineers by recording many evanescent features of the process of power station evolution.

His book, with information and illustrations reproduced from old volumes of the ELECTRICAL REVIEW and other contemporary records, gives an account of the most important early power stations in England, and describes many of the novel experiences encountered when putting these stations to work to provide public electricity supplies. The failures which inevitably occur when major technical developments are being undertaken are not omitted, but are described in sufficient detail to enable discriminating readers to take salutary lessons therefrom. An account of the struggles between advocates of direct and alternating current systems is given which is particularly lucid and inspiring, and which concludes with the prophetic suggestion that the end of this struggle is not yet.

Adequate technical information is included to show the gradual clarification of ideas on both the thermal and the electrical sides, and the author makes urbanely ironical references to certain of the inventions which were incorporated by eminent engineers of the past in their clients' or their employers' stations. Sufficient reference is made to the pioneers of the power station industry to justify the reviewer in expressing the hope that Mr. Parsons will write more about these interesting personalities.

The book concludes with technical appendices on "The Heat of Power Stations," and "The Effect of Load Factor and Output on Efficiency."—C. W. M.

Calculation of Fault Currents in Electrical Networks. By R. T. Lythall. Pp. 69; figs. 86. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, W.C.2. Price 8s. 6d.

A large proportion of the short-circuit calculations that become necessary in the design of distribution systems may be done either in one's head or at the worst on the back of an envelope. It is therefore surprising that so many engineers either do not acquaint themselves with the very simple processes by which these calculations may be made, or use clumsy and unnecessarily laborious methods.

One of the reasons is that some writers on the subject have been more concerned to impress the reader with their own erudition than to teach him the simplest way of doing the job. The author of this book has not made this mistake. He has adopted the excellent scheme of setting out the calculations as a series of rules, and then demonstrating their use by well-chosen examples. Anyone who works through these should find himself subsequently able to tackle most of the short-circuit calculations likely to be encountered in installing public or private electric supply systems. In particular, the example in Chapter IV contains all the elements of the majority of cases that are likely to occur in practice. The calculation of unsymmetrical and earth faults is intentionally omitted, as these matters are in the main the province of specialists.

The author has so rigorously eschewed the complex as to omit any explanation of the very simple theory which underlies the methods he describes. This is rather a pity, as it would only have occupied perhaps two pages. On pages 10 and 17, on the other hand, he has allowed "j" to slip in, unnecessarily and, one feels, unfortunately, because this symbol may cause uneasiness to anyone who is not familiar with its use. The treatment of added resistance is perhaps rather less thorough than the remainder of the book. Resistance is not mentioned in Chapter V, on low-voltage networks, although it is here, of course, that its effect is greatest. Mr. Lythall rightly remarks that the percentage reactance method is the most convenient for general use. Would it not have been better then in an elementary treatise to omit all reference to the ohmic method?

The addition of a number of parallel reactances as on page 24 is better done by repeated application of the formula $X=(X_1\times X_2)/(X_1+X_2)$ (page 11) than by taking the reciprocal of the sum of the reciprocals. The latter process always involves one with decimal numbers having many zeros after the point, which are difficult to calculate without mistakes.

As a second edition will certainly be needed, the opportunity should be taken to convert to a percentage basis the very useful tables of reactances and resistances at the end, and to make a careful revision of the grammar and syntax. Engineers are perforce neat in their work and should be so in their writing. If one makes these minor criticisms it is merely to emphasise that one can recommend this book after judging it by an exacting standard.—C. J. O. G.

Electric and Magnetic Circuits. By F. A. FISH. Third edition. Pp. 228; figs. 133. McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. Price 20s.

The appearance of a third edition of this book may be taken as some indication of its utility to junior students as an introduction to electrical technology. In this edition the chapter on distorted waves of AC has been strengthened, and the matter of three-phase power factor has been dealt with on modern lines.

The treatment is generally lucid and the mathematics is fairly simple, although the reader is supposed to be familiar with the elements of the calculus. A feature of the chapter on electromagnetism is the clear explanation of commercial units. The section on AC theory is quite good, the explanation of graphical vectors is clear, and in the application of vectors to polyphase problem the author has been careful to show the importance of polarity in interconnected circuits. The chapter on distorted waves is somewhat over-technical for a book of this character, and the treatment of polyphase power does not seem to be quite as simple as it might be. As the author has had to introduce the velocity of light constant in his chapter on electrostatics, he might well have rounded off the book by a brief chapter on the theory of electrical units.

The production and the illustration of the book are both good, but its utility to the student would have been materially increased by the inclusion of more fully worked numerical examples in the text and by the provision of a selection of problems for solution.—G. W. S.

Television: The Electronics of Image Transmission. By V. K. Zworykin and G. A. Morton. Pp. 646; figs. 495. Chapman & Hall, Ltd., 11, Henrietta Street, W.C.2. Price 36s.

The joint authors of this comprehensive manual are well known for their work in the Electronics Research Laboratory of the R.C.A. Manufacturing Co. of New York. In particular, Dr. Zworykin has to his credit the invention of the iconoscope image transmission tube.

The first section is devoted to fundamental physical phenomena associated with television. Among these are the emission of electrons from solids, including secondary emission; fluorescence (or, as the authors point out, more accurately, cathodoluminescence); and electron optics. A fairly complete mathematical treatment is included in this part of the book, but the practical side is also well covered, and the section terminates in a chapter on modern vacuum practice.

The second section deals broadly with television as a whole, covering the fundamentals of picture transmission and reception; the principles of ultra-high-frequency transmission and reception applied to television; and the more important methods of picking up and reproducing images. It is interesting to note that the authors credit the first suggestion of a cathode-ray pick-up device to Campbell Swinton in a letter to *Nature* in June, 1908. The reproducing systems described include various mechanical devices, the Kerr cell, the Scophony supersonic light valve and, of course, the "kinescope," which is the American term for the cathode-ray receiving tube.

The third part of the book deals in detail with the components of an electronic television system. Two long chapters are devoted to the iconoscope in its various forms, including the image-multiplier type. In addition to theoretical and practical considerations, constructional details are given. The kinescope is treated in the same way in the next chapter, while another whole chapter is devoted to the electron gun, the electrode system of a cathode-ray device.

The book then deals in detail with video amplifiers and scanning and synchronisation, and the section is completed by chapters on the television transmitter and the receiver, the latter including a complete circuit diagram with component values. The final section, dealing in detail with the American R.C.A.-N.B.C. television project, is of less practical interest to British readers, although it does enable interesting comparisons to be made with the Marconi-E.M.I.-B.B.C. system.—W. E. M.

The New Technique for Supervisors and Foremen. By Albert Walton, Ph.D. (233 pp.) McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. Price 16s. 6d.

Psychology, in the hands of some exponents, entitles it to vie with economics for the appellation of the "dismal science." This book, to adapt an expression used by the author, is industrial psychology for laymen by a layman and it is refreshing to read a work which has been able to steer clear of scientific and pseudo-scientific terms.

It deals very largely with the means of assessing the suitability of individuals for industrial positions and their ability to handle men, and gives a great deal of advice to supervisors on the way to fit themselves for their duties. Much attention is given also to the difficult matter of stimulating interest in what are usually monotonous jobs. The subject of culture or "self improvement" is among the other matters covered by the author.—J. H. C.

Practical Electricity. By Terrell Croft. Revised by George H. Hall. Fourth Edition. Pp. 701; figs. 599. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, W.C.2. Price 20s. net.

The previous edition of this American book was reviewed in our issue of September 22nd, 1933, and beyond noting the respects in which it has been brought up to date, what we then said still applies. The work is of a very elementary character, but there seems to be no doubt of its popularity for, of the first three editions, no fewer than 8, 18 and 13 impressions, respectively, have been issued.

The book deals with the fundamentals of electricity and magnetism, AC and DC machines, cells and batteries, transformers, AC theory and systems, and electronic tubes. In the present edition new developments and methods of application have been included, particularly in respect of the composition of matter, the electron theory, and electronic tubes. As in previous editions, the illustrations catch the eye immediately and are really excellent in their directness and clarity.—S. A. S.

(*Continued on next page*)

PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

IT has been decided not to hold the 1940 annual dinner of the Southern Division of the Electrical Power Engineers' Association to members of the National Executive Committee of the Association.

Major V. Z. de Ferranti, M.C., R.E., brought home from France among the last of the British Expeditionary Force, has now been released from his military duties to resume control of Ferranti, Ltd.

Dr. A. P. M. Fleming, O.B.E., C.B.E., D.Eng., M.Sc., M.I.E.E., has had the distinction of Fellow of the City and Guilds of London Institute (F.C.G.I.) conferred upon him.

Mr. T. A. Eades and **Mr. A. N. Rye** have been appointed directors of the Telephone & General Trust, Ltd.

Mr. F. Hollyer and **Mr. A. N. Rye** have been elected directors of Telephone Properties, Ltd.

Councillor Mrs. Gregory, chairman of the West Ham Corporation Electricity Committee, and only woman member of the Conference of the Municipal Electrical Undertakings in Greater London, was recently elected vice-chairman of the Conference. In the absence of the new chairman, Alderman G. B. Brooks (St. Marylebone), Mrs. Gregory presided.

Worcester Corporation Electricity Department has appointed **Mr. R. C. Howard** as meter superintendent. Mr. Howard has been acting in a similar capacity with the West Hampshire Electricity Co., Ltd., and the Ringwood Electric Supply Co., Ltd.

Miss E. A. Corliss, electric cookery demonstrator with Worthing Corporation Electricity Department, has been presented with cutlery and an electric kettle from the staff of the Electricity Department on the occasion of her marriage to Mr. H. Gregory, of Worthing. She also received an electric coffee percolator from the Electrical Association for Women (Worthing Branch). Miss Corliss will carry on with her duties for the duration of the war.

Gunner G. Conradi, R.A., was married recently to Miss Dulcie P. Cohen. Gunner Conradi is the eldest son of Mr. E. S. Conradi, of the British Central Electrical Co., Ltd.

Mr. H. G. F. Gamble, of the Northmet Co., has recently undergone a serious operation at the Royal Masonic Hospital, and his many friends in the electrical industry will be glad to learn that he is making satisfactory progress.

Mr. F. G. Raynon has been appointed mains superintendent to the Whitehaven Corporation.

Mr. H. Bentham, A.M.I.E.E., has been appointed managing director of the following companies:—Boston & District Electric Supply Co., Ltd.; Colne Valley Electric Supply Co., Ltd.; Lothians Electric Power Co.; Musselburgh & District Electric Light & Traction Co., Ltd.; and Northwood Electric Light & Power Co., Ltd.

According to the *Edison Electric Institute Bulletin*, leave of absence from his duties as president of the Edison Electric Institute has been granted to **Mr. C. W. Kellogg**, in order that he may serve as consultant to the sub-committee recently appointed to advise the National Defence Advisory Commission on electric power problems.

Mr. W. J. Burke, until recently the chief electrical engineer for Kodak, Ltd., Wealdstone, has now joined the staff of the British Central Electrical Co., Ltd., of 6 and 8, Rosebery Avenue, E.C.1, as an outside technical representative.

Mr. Lester H. Graves is to deliver his presidential address on September 9th at the I.E.S. Convention which is being held at Sprink Lake, N.J., from September 9th-12th. The proceedings will open with an address of welcome by Mr. T. R. Crumby, president of the Jersey Central Power & Light Co., and during the four days of the convention a large number of papers dealing with the many aspects of illumination will be read and discussed, while a number of entertainments have been arranged.

Mr. A. D. Cameron, who is to be the next president of the American Illuminating Engineering Society, has been identified with the lighting field for thirty years. The *Electrical World* states since 1931 he has been with the Holophane Co. in the capacity of vice-president and a member of the board of directors. He entered the General Electric Co. street-lighting department in 1910, subsequently becoming manager. Mr. Cameron has been an active member of the American I.E.S. for many years, serving on a number of committees, and as general secretary for three years and vice-president for two years.

Mr. W. G. Probert, charge engineer at Halifax power station, recently resigned to take up an appointment as assistant power station superintendent with the Mersey Power Co. at Runcorn, and the Halifax Corporation Committee on August 19th approved the appointment of **Mr. C. H. Fielding**, at present engaged as assistant shift engineer with the Oldham Corporation. Mr. Fielding is a B.Sc. (Tech.) and an associate member of the Institute of Mechanical Engineers.

In the report in our issue of August 9th of the presentation made to **Mr. E. Seddon**, we inadvertently stated that he was a past-president of the Royal Society of Arts. We should, of course, have said that he was a past-president of the Royal *Scottish* Society of Arts.

Obituary

Mr. R. Bruce Baxter, prominent in Canadian electrical and public utility management circles, died in Montreal on July 2nd at the age of fifty. According to the *Electrical World*, Mr. Baxter resigned from the Alberta provincial telephone system to become managing director of the Calgary Power Co., and was also appointed managing director of the Montreal Engineering Co., which appointments he held until his death. He was also a director of the Prairie Power Co., Ltd., and the Ottawa Valley Power Co., and was president and director of Maritime Electric Co. He served as president of the Canadian Electrical Association in 1935-36.

Mr. J. M. Barbour.—The death has occurred of Mr. John Mitchell Barbour, a member of Paisley Corporation Electricity Department for forty years, and secretary of the Paisley Association of Electrical Engineers for many years.

Will.—Mr. C. F. Tufnell, late chairman of the Hendon Electric Supply Co. and other companies, left £93,286 with net personalty £85,670.

New Books (*Concluded from preceding page*)

Principles of Television Engineering. By D. G. Fink. Pp. 541; figs. 313. McGraw-Hill Publishing Co., Ltd., Aldwych House, W.C.2. Price 33s.

The function of this book, according to the author, is to enable the technical worker to make the transition from familiarity with radio engineering to familiarity with television engineering, and it is assumed that the reader is acquainted with the former.

The first few chapters deal with general principles, including image analysis, camera action, formation of electron beams, deflection and synchronisation. Next comes an analysis of the video signal, with special reference to the American R.M.A. standard. Much of this is applicable to the British standard, if we remember that the British system has positive polarity (increased signal gives increased brightness) whereas the American is the reverse of this, while the synchronising signals differ somewhat.

Video amplification is dealt with at some length in the next chapter, and is followed by carrier transmission of video signals, and image reproduction. Television broadcasting practice, in another chapter, deals in detail with the practical side of American transmitter technique, while the succeeding chapter on television receiver practice gives much information on the design and testing of receivers, including complete circuits of two different models. In conclusion there is an appendix of transmission standards, recommended practices, definitions, and also the names of controls.

The treatment is for the most part free from advanced mathematics, and should be readable by any well-informed radio and electrical engineer.—W. E. M.

Mathematical Methods in Engineering. By Theodore v. Kármán and Maurice A. Biot, pp. 505; illustrated. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, W.C.2. Price 26s.

In the opening paragraph of the preface to this book the authors say that the need is not so much for more mathematics as for a better understanding of the potentialities of its application. The last sentence is not only the keynote of the book, but also an accurate statement of fact which it is impossible to over-emphasise. In the present work the authors have employed the method of selecting certain representative groups of engineering problems and showing the mathematical approach to their solution, certain parts, however, dealing primarily with mathematical subjects presented from the viewpoint of their application rather than of their purely logical development.

The first two chapters deal with ordinary differential equations and Bessel functions and are essentially of a mathematical character. The next relates to fundamental concepts of dynamics and includes vector algebra, gyroscope motion and a study of Lagrange's equations for generalised co-ordinates. Elementary problems in dynamics form the subject of Chapter IV, and these embrace studies of the pendulum and the aeroplane. Chapters V and VI deal with small oscillations of conservative and non-conservative systems, which find their practical applications in problems associated with the compound pendulum, the gyroscope, electric circuits, the wing flutter of aeroplanes, and aeroplane stability.

The differential equations of the theory of structures form the subject of Chapter VII, which is concerned with the equilibrium and harmonic oscillations of cords and beams. The practical applications given relate to beam deflections, the suspension bridge, the critical speed of a rotating shaft, buckling of columns, and loads on aeroplane wings. Chapter VIII shows the applications of Fourier series to structural problems with some special reference to beams, rotating shafts and columns.

Chapters IX and X deal respectively with the complex representation of periodic phenomena and transient phenomena and the operational calculus. The studies given are of both electrical and mechanical circuits. Chapter XI, the last, is devoted to equations of finite differences applied to engineering. Such equations are used as approximations to differential equations and in connection with electrical and mechanical systems consisting of many identical components. Beams, trusses, overhead line insulators, engine crankshafts, and electric filters have been selected to illustrate the practical applications of the type of equations in question.

The book may be regarded as a very sound link between pure mathematics and engineering practice, and one which, unhesitatingly, can be recommended to engineers.—S. A. S.

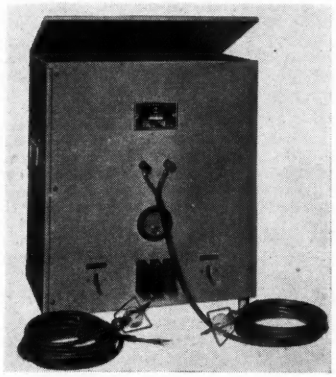
NEW ELECTRICAL PRODUCTS

A Review of Equipment Recently Marketed

Emergency Lighting Apparatus

JUST as air-raid precautions have developed with knowledge gained from subsequent events, so also has the "Ensur-a-lite" outfit for emergency illumination.

This product of the EDISON SWAN ELECTRIC CO., LTD., 155, Charing Cross Road,



"Ensur-a-lite" emergency battery with "Tungar" charger

London, W.C.2, consists essentially of a 6- or 12-V battery and "Tungar" charger enclosed in a metal case of grey finish and pleasing appearance. For special requirements the normal charging rate can be reduced without extra cost providing instructions are given at the time of ordering.

Normally two switches respectively control the AC input and lamps, with double-pole fuses on the AC side and single-pole in the battery circuit. An indicating instrument is provided for the charging current and two double-pole sockets for lamp plugs. During an air raid the battery could be left on charge with the lamps switched on, so that in the event of any mains failure, the full battery capacity would be available from that instant rather than from the commencement of the raid.

Ventilating Air-raid Shelters

From three to five times the number of people may be accommodated in an air-raid shelter if it is ventilated. To guard against the effects of a failure of electricity supply, the fan should be capable of instant conversion to manual operation. The maximum power which can be exerted by the average person for a short continuous period is 1/6 HP, which is enough to provide air for a shelter for fifty people.

CROMPTON PARKINSON & CO., LTD., Electra House, Victoria Embankment, W.C.2, have developed geared units for both 50- and 100-person shelters. In the first case the centrifugal fan, which draws air through gas filters and creates a slight plenum in the building, is driven by a single-phase ¼ or ½-HP 2,850 RPM motor

Type "CPE" geared unit for ventilating air-raid shelters, using Crompton "Minor" motor

for split-phase, capacitor or repulsion-induction starting.

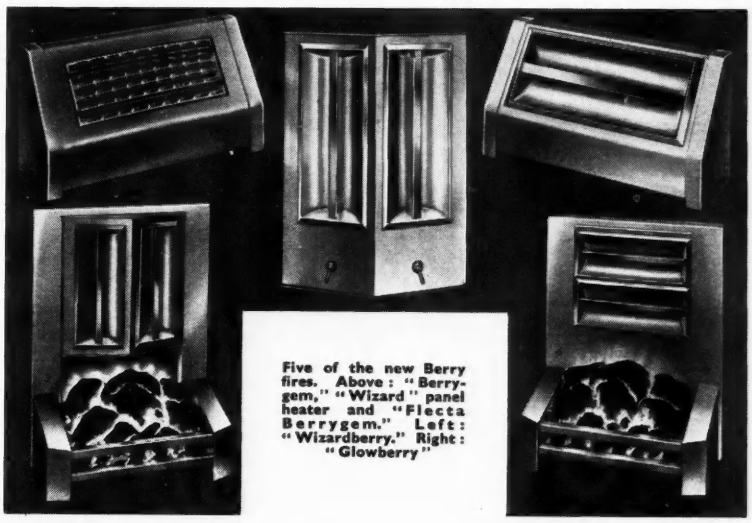
On the other end of the motor shaft is a triple-spur gear box, through which the fan can be operated by a handle turned at 52 RPM by means of a 12-in. crank and a 9-in. loose-collar grip, the two gear shafts being co-axial.

For 100-person shelters the standard motor for single-phase is a repulsion-induction machine of ½ HP, but a capacitor-start motor can be fitted or three-phase or DC motors where required. Two handles at right angles to the motor shaft are employed, and this arrangement requires a low-speed bevel train in addition to the two spur trains. For continuous quiet running under normal conditions, a model is available in which the gears can be disconnected by means of a centrifugal clutch which engages automatically when the handles are turned. The handles of all units are automatically freed on their shafts as soon as the supply of electricity is resumed.

New Fires

The introduction by BERRY'S ELECTRIC, LTD., 85-86, Newman Street, London, W.1, of seven new fires is likely to provide an impetus to sales during the coming season. All the models have been produced with an eye to present-day requirements and conditions. Designs have been simplified without loss of attractiveness, while increasing use has been made of sheet metal pressings, with the almost entire elimination of castings and non-ferrous materials.

Two imitation coal fires, the "Wizardberry" and "Glowberry," are identical except that the former has vertical elements and the latter horizontal, each being loaded at 2 kW. In the "Wizardberry" the elements are slightly splayed to give a wide angle of radiation, the cowl formed by the splaying providing a chimney effect. Both models have flat backs.



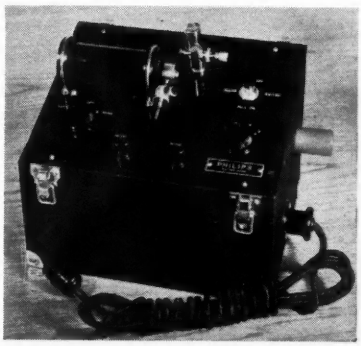
Five of the new Berry fires. Above: "Berrygem," "Wizard" panel heater and "Flecta Berrygem." Left: "Wizardberry." Right: "Glowberry"

The neat 1-kW "Berrygem" (bar-type element) and "Flecta Berrygem" (reflector element) are especially suitable for warming air-raid shelters and small rooms, while the "Wizard" panel heater, with two 1-kW splayed reflector elements giving a wide angle of radiation, fixes directly to the wall and no cutting away is necessary. Intended specially for factory and office use, the "H. B. Berry" fire, available in 2- and 3-kW loadings, has a solid cast base and elements inclined slightly upwards. All the designs of electric fires mentioned are available in either silver or "Berry bronze" finishes.

Electro-medical Equipment

A wide range of electrical apparatus for medical purposes is offered by PHILIPS ("METALIX") LAMPS, LTD., Century House, Shaftesbury Avenue, London, W.C.2, the latest addition to which is a portable faradic unit for both mains and battery operation in a really compact set measuring no more than 9 in. by 7 in. by 8 in. and weighing only 13½ lb. The advantages of this will be obvious, particularly when the apparatus is required for use in emergencies.

The unit is well finished with an ebonite panel, chrome fittings, and morocco leatherette case. The cover can be instantly and completely removed,



Philips portable electro-medical faradic outfit for both mains and battery operation

and the control panel is sloped at a convenient angle. A switch on the panel gives choice of operation from mains or direct from the batteries, each model being of exactly the same style and size and light in weight.

The other models available are a galvanic and sinusoidal mains unit with double-wound transformer, copper oxide metal rectifiers and special smoothing circuit; faradic battery of standard Smart-Bristow type with "on and off" and four-layer switches, and movable iron core; faradic mains unit operated from a double-wound transformer, giving an earth-free current; and galvanic battery fitted with 90-V dry cell.

Regimental Badge Lamp Standard

A portable lamp standard and shade embellished with a regimental badge, the latest addition to the range of fittings of the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, is very suitable for presentation and gift purposes during the war.

The standard is made of cream earthenware, the appropriate gilt and enamelled crest being fixed in a prominent place. A bakelite switchholder and silk-covered flexible are supplied with the standard.

The parchment shade which is provided to match is of Empire pattern, with colour graduated darker towards the edges. It has a similar badge fixed in the centre, framed with a gilt transfer design. The shade has a spring clip method of fixing on to the lamp, which should be of 40-60 W.

COMMERCIAL and INDUSTRIAL NEWS

Machine Tool Appeal. E.A.W. Film. Dilution of Labour

Machine Tools for National Work

THE Minister of Supply has sent an urgent appeal to 20,000 firms in all parts of the country that every spare second-hand machine tool should be offered to him for immediate purchase for war production. The Minister points out that he has compulsory powers and can use them where necessary, but he expects quicker results by an appeal to the patriotism of the firms concerned. Arrangements have been made to deal with the large number of offers which it is anticipated will be forthcoming, and an appropriate price will be paid for every tool turned over.

In a statement issued on Monday last, the Minister of Supply announced that already nearly 3,000 firms have responded to his appeal, and a number are replanning their shops so that they may be able to spare the largest possible number of machine tools.

Mr. A. Edwards asked the Minister of Supply in the House of Commons on August 14th what steps had been taken to provide suitable electricity supply for machine tools from the United States of America with motors suitable only for French supplies. Mr. Herbert Morrison said that the electrical trade had been consulted, and were co-operating fully with the Machine Tool Control so that any machines which required electrical alterations could be put into service with the minimum of delay. In some cases alterations were being made to electrical equipment, and in others simple stationary transformers were being added to permit the original electrical equipment to be used.

Limitation of Supplies

Members of the Electrical Wholesalers' Federation have been notified by Mr. A. Albrecht, director and secretary, that under Statutory Order 1940, No. 874 (Limitation of Supplies) gas lighters operated by a dry battery, as marketed by the Ever Ready Co., No. 2247, fall within Class 14, which includes all mechanical lighters, other than those which form component parts of gas fires. Members are advised to communicate with the Board of Trade, and request that they shall be allowed to register for Class 14.

Iron and Steel Control

It has come to the notice of the Iron and Steel Control that a number of contractors have been using symbols without first obtaining the written authorisation of the Department concerned. In some cases failure to obtain the necessary authority has resulted in contractors using the wrong symbols. The Iron and Steel Control points out that in every case sanction, in writing, should be obtained from the appropriate Department before applying a symbol to a job, or jobs. Sub-contractors should obtain written confirmation from the main contractors. A serious view will be taken by the Ministry of Supply of any future failure to comply with these regulations.

Mr. J. M. Duncanson has succeeded Mr. R. Alsop as Deputy Controller of Steel Supplies under the Ministry of Supply. He has been succeeded in the position of Assistant Controller of Steel Supplies by Mr. A. G. E. Briggs, who was formerly the Director of Alloys, Special Steel and Ferro-Alloys for the Control.

Workmen's Compensation

Under the Workmen's Compensation (Supplementary Allowances) Act passed this Session, workmen who are entitled to weekly payments of compensation under the Workmen's Compensation Acts in respect of an accident which happened on or after January 1st, 1924, are entitled, as from August 19th, to increased benefits. In the case of total disability (male or female) there is a supplementary allowance of 5s. a week in every case, and in the case of a male workman there are allowances for children under fifteen years of age at the rate of 4s. a week for each of the first two children and 3s. a week for each additional child. Where the workman is only partially disabled and therefore earning or able to earn something less than his pre-accident wages, the allowances are scaled down so as to bear the same proportion to the full rates as his partial disability weekly payment bears to the weekly payment to which he would be entitled if he were totally disabled. The total amount of the weekly payment and allowances is not to exceed, in cases of total incapacity, seven-eighths of the average weekly earnings of the workman before the accident, and in cases of partial incapacity seven-eighths of the difference between the pre-accident and post-accident earnings.

It is estimated that additional allowances will mean an increase of about 30 per cent. in the total amount of compensation payable under the Acts, which is estimated to be about £9,000,000 a year.

E.A.W. Film

As a contribution towards the National Food Campaign the Electrical Association for Women, in collaboration with the Board of Education, has produced a film demonstrating the foods which are of value in building up sound health from youth onwards. "Miss T.," as the film is called, is based on the well-known poem by Mr. Walter de la Mare, which, it will be remembered, commences:—

"It's a very odd thing
As odd as can be
That whatever Miss T eats
Turns into Miss T."

As the pages of the photographic album of Mary Turner, or "Miss T," are turned, she is seen as a smiling baby, as a happy

A "still" from the E.A.W.'s film "Miss T."

little girl in a nursery school, as a girl of ten and of fourteen, learning lessons and playing games in a modern county school, and later, as a cheerful and competent worker testing lamps in an electrical research laboratory (the G.E.C.'s), and then "Digging for Victory" in the family allotment. Throughout the various stages of Miss T's development, emphasis is laid on the foods she eats which enable her to grow up healthy and strong and full of vitality. By vivid diagrammatic representation the various foods are shown merging into the bones, teeth, blood and healthy tissues of the growing child. The part of the grown-up "Miss T" is taken by Miss Katherine Page, the young actress who took the title role in "Marigold." She is the daughter of Sir Archibald Page, chairman of the Central Electricity Board.

The film is available for showing in electricity showrooms, and particulars can be obtained on application to the Association at 20, Regent Street, London, W.1.

Control of Plastics

The Minister of Supply has appointed Mr. A. Vyvyan Board to be Controller of Plastics. The Control is being set up to regulate the consumption of plastics which are being used in increasing quantities in connection with the armament programme. The Control will also co-ordinate the arrangements for the supplies of the principal raw materials used in these manufactures, the more important being formaldehyde, urea, phenol, cresol, cellulose acetate, nitro-cellulose and rennet casein. A further announcement will be made in due course regarding the detailed control arrangements. Mr. Board is at present the Controller of Molasses and Industrial Alcohol, which post he will continue to hold. Inquiries should be addressed to the Ministry of Supply, Plastics Control, Great Burgh, Epsom, Surrey.

Insurance of Non-manual Workers

The Minister of Labour and National Service reminds employers and employees that, under the Unemployment Insurance Act, 1940, on September 2nd non-manual workers whose salaries exceed £250 but not £420 a year become insurable against unemployment. Workers who will be brought into insurance should take steps to obtain unemployment books by that date from any convenient employment exchange. Men of the age of 65 and over, and women of the age of 60 and over, who are affected by the new provisions will be insurable at the employer's rate only. They should apply for special Class P (X) cards at a post office. Non-manual workers remunerated at a rate exceeding £250 but not exceeding £420 a year also become insurable in Northern Ireland on September 2nd. Under the Unemployment Insurance Emergency Powers (Amendment) (No. 3) Regulations, 1940, provision is made for the exception from unemployment insurance of certain persons who are employed by employers holding certificates of exception. The only employers who are entitled to hold certificates are Government Departments, public or local authorities, railway companies, public utility companies and undertakings (gas, water, hydraulic power, electricity, docks, canals and tramways) and bodies whose employees have rights in a statutory superannuation scheme.

Supervisors' Programme

The Association of Supervising Electrical Engineers opens its 1940-41 session on October 15th when Mr. H. W. Swann will deliver his presidential address. The other meetings to be held are as follows—November 19th: "Earthing," by Mr. H. W. Grimmett. December 17th: "Facts and Fallacies Relating to Electric Space Heating Installations," by Mr. R. Grierson. January 21st: "Wartime Temporary Expedients," by Mr. F. S. Naylor. February 18th: "The Safety of Consumers in Rural Areas," by Mr. H. G. Taylor. March 18th: "Production, Selection and Use of Electrical Insulation," by Mr. F. C. Walmsley. April 22nd: "Electricity in the Modern Film Studio," by Mr. F. V. Hauser.

The meetings will be held at the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2, commencing at 6.30 p.m.

Dilution of Labour

Three agreements relating to the relaxation of existing trade customs for the period of the war have been arrived at by the Electrical Trades Union with the Engineering and Allied Employers' National Federation, the Shipbuilding Employers' Federation and the Admiralty. They provide for the employment of men not normally engaged in the kind of work involved or of unskilled or semi-skilled workers, where there is a shortage of electricians or electrical workers of other classes, upon work normally carried out by skilled men or to assist in such work. Men so engaged are to be paid the skilled electricians' rate if doing skilled men's work and the semi-skilled rate if employed to assist on electricians' work under the supervision of skilled electricians. "Dilutees" will be subject to the usual electricians' conditions, and a register is to be kept of all changes made under the agreements. It is provided that skilled electricians shall enjoy priority of employment.

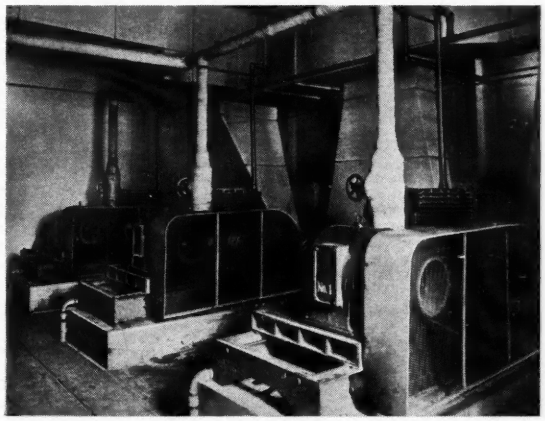
Exchange Control

Of all wartime measures probably the most difficult to comprehend by the layman is the exchange control. A series of articles in the *Financial Times* by "London Wall" has done much to make the subject clear to those who desire to know what it is all about, and these articles

have now been reprinted in the form of a booklet available from the *Financial Times*, 72, Coleman Street, London, E.C.2, at 8d. net. The principal section headings are as follows:—"Principles and Procedure," "Claims for Foreign Currency," "Sterling Transfers to Non-residents," "Operation of Sterling Accounts," "Securing the Proceeds of Exports," "Currency Accounts and Trade," and "Definitions and Forms."

Air Conditioning Installation in Singapore

Climatic conditions in the Straits Settlements are of such a character as to render the matter of air conditioning a most essential consideration where crowds are accustomed to assemble. It was to meet this that the United Engineers, Ltd., of Singapore, included in the equipment of the New World Cabaret, a centre of relaxation and amusement which they designed and built in their home city, plant intended to condition the air of cabaret and restaurant.



Three Crompton Parkinson 50-HP motors driving compressors in an air conditioning plant

This plant incorporates three Carrier Freon compressors each driven by a 50 HP 1,430 RPM, 400 V, 3-phase, 50-cycle AC Crompton Parkinson slip-ring motor. In use the three compressors supply a total capacity of approximately 140 tons of refrigeration. Behind the compressors are duct connections to three Carrier evaporative condensers. In each of these the fan handles 8,000 cu. ft. of air per minute, the driving power being furnished by three 5-HP squirrel-cage Crompton Parkinson motors.

Operating on a basis of a total of nearly 30,000 cu. ft. of air per minute, and driven by a 20-HP Crompton Parkinson slip-ring motor, the main supply air fan draws the dehumidified air from the plant and discharges it into the space being conditioned. The Cabaret has seating capacity for 1,500 persons.

In addition to the installation of complete air conditioning equipment, the United Engineers, Ltd., also carried out a large number of contracts involving the installation of Crompton Parkinson ceiling fans, an outstanding example being the contract for the Singapore Supreme Court Building.

Wages in the Cable-making Industry

The Joint Industrial Council for the Electrical Cable-making Industry announces that the cost of living figure on August 1st (85 per cent. above the 1914 level) will not involve any alteration in wages on the third pay-day in September.

Substitute for Tin Bronze

The research department of the Revere Copper & Brass Co. has perfected the substitution of copper silicon alloys (silicon bronzes) for tin bronzes in which from 2 to 10 per cent. of tin is generally employed, says *Reuter's Trade Service* from New York. If the United States supply of tin should be cut off the new process would provide an adequate substitute, the Revere Company states. Silicon bronze combines high strength with excellent spring properties and corrosion resistance similar to that of copper, says the company. It could be widely employed to advantage, if supplies of tin failed, in recoil cylinders of field artillery, hub liners for locomotives, welding rods, valve diaphragms, spring and switch clips, general spring applications, forgings and sand castings.

Australian Electrical News

The Western Australian Government is making a big drive to foster secondary industries, and there is the possibility that many new factories will be built in what are now country districts. Such an increase in factories will, of course, cause an expansion in the demand for power and also equipment. New industries are also to be started in the metropolitan area, together with increases and additions to existing plants.

A decision to defer, for the time being, the enforcement of regulations made under the Electricity Act concerning the licensing of electrical workers and cinematograph operators was recently announced by the Western Australian Minister for Works (Mr. H. Millington). It had previously been intended to enforce the regulations as from May 1st, but it became apparent that this had been taken to mean that applications had to be lodged by this date, and such enforcement would, for the time being, be postponed.

Winter electrical lines (stoves, heaters, radiators, &c.) are selling well in most parts, although in the west a delayed winter has made the demand for seasonal lines very light. Chain stores which previously cut the prices of many smaller electrical goods are finding the question of supplies a problem, and many of these cut-price goods have now disappeared from their counters. Business, as reported by electrical dealers, is generally good, although delayed shipments have caused some apprehension.

Royal Visit to Beaufoy Institute

The Queen, accompanied by the Hon. Mrs. Geoffrey Bowlby, C.V.O., visited the Beaufoy Institute, Lambeth, recently to see women students being trained under the auspices of the Women's Engineering Society for semi-skilled, skilled and supervisory work in munitions. Her Majesty was received by Miss C. Haslett, C.B.E., president of the Society, and Mr. A. E. Davies, J.P., chairman of the L.C.C., and was conducted through the workshops by Dr. J. N. Long, principal of the Institute. One hundred day and two hundred evening students are now receiving instruction and there is a waiting list of 250 for the next courses. Similar training is being given at the College of Technology, Manchester, where women selected by industry are receiving training prior to promotion. Other centres where the Society has been instrumental in establishing training include one at Glasgow.

A.R.P. Volunteers

The Regional Commissioners for London appeal to employers in business areas to make appropriate arrangements to release trained A.R.P. volunteers among their staff to take up duty during an air raid. They point out that most of the part-time volunteers in the Civil Defence services are enrolled for service near their homes. But in the London region it is the exception for people to work near their homes. The result is that the non-dormitory areas have relatively few volunteers to supplement the whole-time civil defence personnel, and this situation is aggravated by the influx of a large daytime population of workers.

Legacy for the E.I.B.A.

The late Mr. P. J. Sims left £500, duty free, in his will to the Electrical Industries Benevolent Association. Mr. Sims was a vice-governor of the Association and was an active worker on its behalf, remaining a member of its Glasgow Committee after his retirement from service with the General Electric Co., Ltd.

Creosoting Timber

The recently issued B.S.S. 913 relates to the methods of pressure creosoting timber usually employed in this country and includes minimum absorption figures for the effective treatment of a wide range of timbers. Copies of this specification are obtainable from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2/3 post free.

Equipment for Chile

A reader in Santiago, Chile, wishes to get into touch with manufacturers of electrical accessories, such as household switches, lampholders, European pattern plugs, &c., of a competitive type. He is also interested in the sale of irons, heaters and fans. We shall be pleased to give our correspondent's name and address and further particulars to any firm seeking an agent in Chile.

A Request from Brazil

A Brazilian reader, Eng. José M. Braga, General Ozorio, 435, Sao Paulo, would like to receive from British electrical manufacturers their general catalogues of equipment, with prices.

I.M.E.A. Offer

The Incorporated Municipal Electrical Association has offered to the Government the interest accruing on Government securities at present held by the Association, amounting to £10,000, for the duration of the war.

The Savoy Chapel

The architect for the alterations to the King's Chapel of the Savoy, Strand, W.C.2, reference to which was made in our last issue, was Mr. Malcolm W. Matts.

Colliery Fatality

When an inquest was held at Ilkeston Junction on Francis West, aged eighteen, who was killed while at work as a loader at Cossall Colliery on August 2nd, the coroner said it appeared to him that there had been a very slipshod way of dealing with the very dangerous part of machinery—electricity—from the way repairs were carried out. It did not appear to him that there could have been a proper examination and testing of cables; had there been, a broken earth wire would have been found.

Frank Wardle, conveyor attendant and repairer, said that he was sent to repair an electric switch near the coal-cutting machine. Having done so he told another man to switch on at the gate-end switch, and this was done. Deceased switched on at the position where witness had been repairing the switch, and he saw him fall sideways. All efforts to revive him proved in vain.

Walter Chadwick, assistant electrician, said that he gave instructions to Wardle to make the necessary repairs; he thought that he was an electrician and was authorised to do the work, as he had done odd jobs. It was afterwards found that the earth was fractured. This was caused by the continual bending of the trailing cable, and he agreed that it could have been discovered if proper tests had been made.

Prices of Materials

Henry Gardner & Co., Ltd., report August 21st: Copper bars (best selected), sheet and rod, English pig lead, mercury and spelter, no change. English block tin, £261 10s., £1 10s. decrease.

New Catalogues and Lists

British Insulated Cables, Ltd., Prescot, Lancs.—Leaflet N.S.C.5 relating to B.I. fire-resisting insulated cables.

Oldham & Son, Ltd., Denton, Manchester.—An illustrated folder giving particulars of the "Touquette" rechargeable A.R.P. torch.

Gowshall, Ltd., Cheston Road, Aston, Birmingham.—A booklet giving illustrated particulars of signs for wartime.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

ZEITLER lock (present suppliers).

ELECTRICITY SUPPLY

Commissioners' Ruling on Cannock Application. Glasgow Estimates. Newcastle Lighting Conference

Bath.—LOAN FOR APPARATUS.—The Electricity Committee has obtained permission from the Electricity Commissioners to borrow the sum of £5,701 for consumers' electrical apparatus.

Cannock. — EXPENDITURE ON STREET LIGHTING. — Application was recently made by the Electricity Committee for the Electricity Commissioners' approval to a sum of £2,748, representing over-expenditure on street lighting, being charged to the undertaking's appropriation account. The Commissioners have, however, refused to allow the amount to be charged to the electricity undertaking.

Fleetwood.—ANNUAL ACCOUNTS.—A net loss of £927 on the year's working of the electricity undertaking is shown in the annual abstract of accounts. The income was £62,669 and expenditure £64,037. Appropriations during the year included £1,790 to the relief of rates and £472 towards alterations from DC to AC. So far £44,474 has been spent on the change-over. Reserve and revenue balances are reduced from £18,858 to £15,826. Sales amounted to 15 million kWh (an increase of 0.5 million kWh). Of the 7,507 buildings in the town, 93 per cent. are supplied with electricity.

Girvan (Ayrshire).—MODIFIED LIGHTING.—The Lighting Committee is considering a scheme of modified street lighting.

Glasgow. — 1940-41 ESTIMATES. — The general manager of the Electricity Department has submitted an estimate of the revenue and expenditure of the Department for 1940-41 as follows:—Revenue £1,606,350 and expenditure £1,556,665, leaving a surplus of £49,685. Capital expenditure for the year to be met out of loans is:—Specified works: Generation, £6,000; distribution, £89,000. Unspecified works: Distribution, £100,000. In addition, it is expected that capital expenditure amounting to £43,500 for meters, apparatus on hire, &c., will be met out of the year's profit. With regard to the past year, the general manager reports that capital expenditure amounting to £63,657 has been met out of the surplus of £128,113, including £35,646 for meters and £14,703 for apparatus on hire. The Committee instructed the town clerk to apply for the necessary consent of the Electricity Commissioners.

Kettering.—PUBLIC LIGHTING. — The Town Council has authorised the installation of 165 additional street lighting units to complete the lighting of road intersections, main roads and dangerous bends.

Market Drayton.—STREET LIGHTING.—The Urban District Council has agreed to install up to 18 lamps of the approved pattern on street-lighting standards, and has accepted the price of £3 per lamp submitted by the Market Drayton Electric Light & Power Co. for installation and lighting during the season.

Middleton.—ELECTRICITY PROFIT.—The borough electrical engineer (Mr. A. M. Mulliner) reports a net profit of £2,086 on the past year's working of the Electricity Department against a net loss of £327 in the previous year.

Newcastle-on-Tyne.—LIGHTING CONFERENCE.—A meeting of Tyneside local authorities has been called for to-day (Friday) to discuss the area's request for modified street lighting this winter. It is expected that a demonstration of the lighting proposed will be given. It is pointed out that as "starlight" lighting cannot be seen from the air there is no reason why it cannot be used in areas where lighting is now prohibited.

Stanley (Co. Durham).—TARIFF REVISION.—The Urban District Council is revising its domestic tariffs for the Annfield Plain, Stanley, and Tanfield areas as from October 1st. Under the new tariffs the lighting charge for the first 30 kWh per quarter will be 5d. per kWh. and 1½d. per kWh thereafter. The power rate will be 3d. per kWh for the first 30 kWh, all further consumption being charged at 1½d. per kWh.

Sunderland. — HOSPITAL ELECTRICAL EQUIPMENT.—The Town Council is to spend £257 on electrical equipment for the Cherry Knowle Hospital.

Tayport.—SHELTER INSTALLATIONS.—The Town Council is considering the installation of heating and lighting in air-raid shelters.

Wellingborough.—SHELTER LIGHTING.—Electric lighting is to be installed in eleven public air-raid shelters at a cost of £8 13s. each.

Overseas

Canada. — ELECTRICITY CONTROL IN QUEBEC.—The Province of Quebec Electricity Board ceases to exist on August 31st, its place being taken by the Public Service Board created by an Act passed in the last session of the Quebec Legislature. The new Board has been created to form a single commission to exercise the jurisdiction vested in the Provincial Transportation and Communication Board and the Provincial Electricity Board.

Egypt.—ASSUAN DAM SCHEME.—Some divergence of opinion is reported about the extent of the area that could be served by electric power from the Assuan Dam (four-fifths of the water from the overflow of the dam would be utilised for generating power, the remaining fifth being devoted exclusively to irrigation). The opinion is expressed that there would be enough power not only to provide for industries in the Assuan district but also to furnish electric light for the requirements of the area from Assuan to Alexandria, i.e., both Lower and Upper Egypt, but the technical experts who are dealing with the matter say that it is not economic to transmit electricity for more than 200 or 250 miles, because transmission losses become too high. The general belief is that the plant will be confined to supplying power for the production of fertilisers and extraction of iron ore only. Among factories to be supplied with electricity from the proposed station is one for the manufacture of artificial fertilisers, of which at present Egypt imports some £E5,000,000 worth annually, and it will also be possible for Egypt to exploit the iron mines at Assuan. It is estimated that the completed electric plant will allow of some 300,000 tons of fertilisers (nitro-chalk fertiliser has been selected for production) and of 30,000 tons of iron ore being produced annually.

Italy.—HYDRO-ELECTRIC WORK EXCLUDED FROM BAN.—In a broadcast from Rome last week it was announced that there would be a ban on all construction except State defences and hydro-electric works.

Russia. — ELECTRIFICATION OF SOVIET VILLAGES. — According to *Russia To-Day*, considerable research is being carried out by the Power Institute of the Academy of Sciences of the U.S.S.R. on problems relating to rural electrification. As many as 1,000 water-driven mills and 350 miniature hydro-electric power stations are being built by collective farmers, and the Institute is working out designs for suitable equipment. In collaboration with the Power Institute, the Stalin Metal Works of Leningrad has designed a water turbine of 23 HP to be used for driving small flour mills and various agricultural machines, and also to supply electricity for farms. The Electro-Mechanical Laboratory of the Institute is studying electrical wind engines which are extensively used for rural electrification. Of considerable interest is the work undertaken by the Laboratory to combine small hydro-electric power stations with wind engines.

Sweden.—PARAFFIN BANNED FOR LIGHTING.—Notice has been issued by the authorities that no paraffin will be available in Sweden for lighting purposes. In 1938, according to an investigation made by the Swedish Board of Trade, about 80 per cent. of the population used electricity for lighting and a further 17 per cent. could obtain it at a reasonable cost.

COMPENSATION PROCEEDINGS CONCLUDED. —The Swedish Supreme Court has recently completed the compensation awards in connection with the scheme for the regulation of the water level in Lake Vättern, the third largest lake in Europe. This important undertaking, carried out by the Swedish Board of Waterfalls, was completed in 1938, and it is now possible to regulate the flow of water from the lake to the large State-owned power stations on the river Göta Alv. Compensation awarded for damage caused by the raising of the water level has amounted to about 7,000,000 kr., and the actual regulation work has cost 18,000,000 kr. It is, however, estimated that the State has made a profit of about 31,000,000 kr. on this scheme. The compensation proceedings have been continuing for about 15 years. The number of properties concerned was 7,200, and the judgment constitutes a printed book of 735 pages, while papers filed in the case fill 411 files with 42,000 pages in addition to some 1,600 maps, drawings, &c.

United States.—GRAND COULEE DAM NEARING COMPLETION.—The Grand Coulee Dam across the Columbia River is 95 per cent. complete, according to the contracting company. Construction started in 1933, and the Consolidated Builders, Inc., report that a total of 10,106,954 cu. yd. of concrete has been poured.—*Reuter's Trade Service.*

TRANSPORT

Finland.—PROPOSED TROLLEY-BUS SERVICE.—It was recently reported on the Finnish radio that Helsinki Municipality is proposing to establish a trolley-bus service in the city.

Glasgow.—ESTIMATE OF EXPENDITURE.—The transport manager has submitted an estimate of capital expenditure for the year ending May 31st, 1941, amounting to £31,850, including £24,000 for tramcars, which has been approved by the Transport Committee.

London.—TROLLEY-BUSES AND THE PURCHASE TAX.—During the report stage of the Finance Bill in the House of Commons, Sir J. Lamb moved to exclude trolley vehicles from the scope of the Purchase Tax. Mr. Ellis Smith, who seconded, said that over a long period it had been the policy of municipalities and local authorities in general to convert their tramcars to trolley-buses whenever they possibly could. In areas where they had no underground system of the kind that existed in London more and more enlightened municipalities were embarking on such conversion. In addition, an increasing difficulty was the importation of petrol and oil for Diesel engines, and it had been found in many areas that trolley vehicles "running on home-mined coal" were preferable to vehicles whose motive power was derived from imported oil. Progressively minded organisations had pressed on municipalities and Government Departments—and deputations had waited on the Central Electricity Board and others—the need for the encouragement of this conversion policy. It would be a calamity if the Purchase Tax were placed on trolley vehicles.

Capt. Crookshank, Financial Secretary to the Treasury, pointed out that it was not the intention that trolley vehicles should be treated differently from tramcars and omnibuses. In fact, the word "omnibuses" did cover trolley vehicles. It was unusual in legislation to say the same thing twice over, but if Sir J. Lamb was particularly anxious that trolley vehicles as such should appear in the Schedule to the Bill there would be no harm in putting in the words, and he was prepared to accept the amendment. The amendment was agreed to.

Sunderland.—TRAMWAY CONSTRUCTION. —The Town Council is applying to the Minister of Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, extending for three years from December 31st next the time during which the uncompleted portion of the tramways authorised under Section 77 of the Sunderland Corporation Act may be carried out.

NEW PATENTS

Electrical Specifications Recently Published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1938

23212. "Circuit arrangements for magnetic scanning in cathode-ray tubes." British Thomson-Houston Co., Ltd., and D. J. Mynall. August 5th, 1938. (523831.)

33021. "Tuning of radio receivers." E. K. Cole, Ltd., and A. Shackell. November 14th, 1938. (523772.)

36298. "Magnetically loaded cables for the transmission of electrical signals." General Electric Co., Ltd., H. C. Turner and G. R. Polgreen. December 13th, 1938. (523775.)

36611. "Time base devices for cathode-ray tubes in television reception." C. L. Hirshman, and Metropolitan-Vickers Electrical Co., Ltd. December 15th, 1938. (523780.)

37287. "Electro-magnetically operated selecting switches." B. Hinks. December 22nd, 1938. (Cognate application 7902/39.) (524015.)

37308. "Furnaces and the like." J. E. Oram and Wild-Barfield Electric Furnaces, Ltd. December 22nd, 1938. (524016.)

1939

530. "Metallurgical apparatus operated by electrical induction." K. M. Tigerschiold. March 30th, 1938. (523785.)

1210. "Electric wave systems." Telephone Manufacturing Co., Ltd., and L. H. Paddle. January 13th, 1939. (523787.)

1218. "Double-balanced modulating systems for carrier-wave signalling." Standard Telephones & Cables, Ltd. March 3rd, 1938. (523897.)

1317. "Electric current transformers." British Thomson-Houston Co., Ltd. January 14th, 1938. (523800.)

1324. "Production of apparatus,, such as dry shavers comprising small electric driving motors." V. Kobler and K. Kobler (trading as Kobler & Co.). July 23rd, 1938. (Cognate application 1325/39.) (523802.)

1351. "Electric motor control systems." Igranic Electric Co., Ltd. January 14th, 1938. (523808.)

1362. "Audiphones or bone-conduction telephone instruments." January 14th, 1939. H. Koch and Dictograph Products Co., Inc. (523811.)

1364. "Railway signalling systems." Vereinigte Eisenbahn Signal-Werke Ges. January 21st, 1938. (523835.)

1400. "Electrical conduits." Associated Clay Industries, Ltd., and F. Packard. January 16th, 1939. (523820.)

1437. "Miners' lamps." Concordia Electric Safety Lamp Co., Ltd., and C. C. Bleach. January 16th, 1939. (523826.)

1440. "Gas-filled electric-discharge devices and methods of operating them." General Electric Co., Ltd., and M. Pirani. January 16th, 1939. (523839.)

1441. "Electric motor control systems." General Electric Co., Ltd., and E. H. Croft. January 16th,, 1939. (523840.)

1472. "Starting mechanism for magneto-electric machines." British Thomson-Houston Co., Ltd., S. H. Franklin and A. W. Masters. January 16th, 1939. (523898.)

1473. "Electric igpition systems for internal combustion engines." British Thomson-Houston Co., Ltd., and K. J. R. Wilkinson. January 16th, 1939. (523899.)

1474. "Electric - discharge lamps." British Thomson-Houston Co., Ltd., W. J. Scott, J. T. Anderson and R. S. Wells. January 16th, 1939. (523849.)

1475. "Electric - discharge lamps." British Thomson-Houston Co., Ltd., W. J. Scott, J. T. Anderson, and R. S. Wells. January 16th, 1939. (523849.)

1479. "Control of automatic electric switching devices." Brown, Boveri & Cie. Akt. Ges. January 14th, 1938. (523956.)

1509. "Electrical-discharge tube hair-waving device." S. C. Whitman. January 19th, 1938. (523855.)

1519. "Electric dry-contact rectifiers." Westinghouse Brake & Signal Co. June 15th, 1938. (523858.)

1537. "Wall and side-lighting fittings." Holophane, Ltd., and S. English. January 17th, 1939. (523903.)

1560. "Electrical heating of vehicles." C.A.V., Ltd., W. H. Glaser and S. F. H. Parsons. January 17th, 1939. (523861.)

1565. "Electric fans." A. Biolik. January 18th, 1938. (523908.)

1588. "Methods of modulation in television and like systems." G. Weiss. January 17th, 1938. (523862.)

1589. "Electron multipliers." G. Weiss. January 17th, 1938. (523863.)

1602. "Electric plug connectors." Standard Telephones & Cables, Ltd., and J. R. Beard. January 17th, 1939. (523865.)

1605. "Coupling-elements for electron-discharge devices and for other electrical apparatus." Standard Telephones & Cables, Ltd., and A. I. Vangeen. January 17th, 1939. (523866.)

1607. "Telegraph signal regenerators." Creed & Co., Ltd., and F. P. Mason. January 17th, 1939. (Addition to 460150.) (523867.)

1635. "Variable electric condensers." Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. January 17th, 1938. (523,869.)

1638. "Electric-discharge devices with quartz or like envelopes." General Electric Co., Ltd. (Patent-Treuhand Ges. für Elektrische Glühlampen). January 17th, 1939. (523923.)

1639. "Gasfilled electric-discharge devices and means for operating them." General Electric Co., Ltd. (Patent-Treuhand Ges. für Elektrische Glühlampen). January 17th, 1939. (523924.)

1640. "Pendant electric lighting fittings." General Electric Co., Ltd., and A. J. Burbidge. January 17th, 1939. (523925.)

1649. "Means for ventilating electric machines." British Thomson-Houston Co., Ltd., J. H. Walker and A. T. Stretton. January 17th, 1939. (523926.)

1661. "Adaptor for electric dry batteries." C. M. R. Balbi. January 17th. 1939. (523931.)

1675. "Snap-action electric switches of the ironclad type." Walsall Conduits. Ltd., and E. Gough. January 18th, 1939. (523933.)

1676. "Dynamo-electric machines." F. Tellbert. January 19th, 1938. (Cognate applications 1677/39 and 1678/39. (523934.)

1688. "Electric signalling systems." General Electric Co., Ltd., S. W. Richards and W. R. Rose. January 18th, 1939. (523966.)

1703. "Dual-voltage electric motor aggregates." Westinghouse Electric International Co. February 26th, 1938. (523969.)

1719. "Magnetising of annular magnets." L. Jurak. February 16th, 1938. (523970.)

1741/1742/1743. "Ohmmeters." H. S. Macadie, H. Fraenkel, and Automatic Coil Winder and Electrical Equipment Co., Ltd. January 18th, 1939. (523978/523979/523980.)

1764. "Winding insulation for electrical apparatus." British Thomson-Houston Co., Ltd. January 18th, 1938. (523981.)

1765. "Secondary electron-emission layers for use in electron-discharge devices." British Thomson-Houston Co., Ltd. January 18th, 1938. (523982.)

1766. "High-tension electric switches." D. R. Davies, and Metropolitan-Vickers Electrical Co., Ltd. January 18th, 1939. (523983.)

1783. "Combined electric switch and coupling units." Electrolux, Ltd. January 18th, 1938. (523985.)

1812. "Rapid switching devices, particularly for electric switches and valves." Fabrik Elektr. Apparate F. Sauter Akt. Ges. January 19th, 1938. (523993.)

1813. "Railway traffic controlling apparatus." Westinghouse Brake & Signal Co., Ltd. June 22nd, 1938. (523940.)

1892. "High-pressure metal-vapour electric discharge lamps." General Electric Co., Ltd., and V. J. Francis. January 19th, 1939. (523024.)

1896. "Electric lighting fittings." General Electric Co., Ltd., and S. Hubbold. January 19th, 1939. (524025.)

1899. "Telephone systems." J. E. Pollak (Associated Telephone & Telegraph Co.). January 19th, 1939. (524003.)

1901. "Dynamo-electric machines." British Thomson-Houston Co., Ltd. January 20th, 1938. (524026.)

1908. "Plug-and-socket connections." C. O. Browne. January 19th, 1939. (524004.)

1936. "Metal vapour rectifiers." Patentverwertungs Ges. Hermes. January 19th, 1938. (524031.)

1943. "Electric control system for electric winches and the like." January 19th, 1939. Stothert & Pitt and R. W. J. Coombes. (524033.)

1997. "Circuit arrangements for use in television or like systems." Baird Television, Ltd., and C. Nuttall. January 20th, 1939. (524038.)

2001. "Arrangements for generating electric currents of saw-tooth waveform." Telefunken Ges. für Drahtlose Telegraphie. January 20th, 1939. (524039.)

2012. "Wall-boxes and junction-boxes for use in connection with electrical wiring conduits." C. L. Arnold, R. W. Dowsett and M.K. Electric, Ltd. January 20th, 1939. (524043.)

2021. "Method of and apparatus for controlling the supply of electrical power to a plurality of electrical loads." Westinghouse Electric International Co. January 29th, 1938. (524046.)

2032. "Circuits for electron-discharge devices employing secondary emission." Kolster-Brandes, Ltd., D. S. B. Shannon and P. K. Chatterjea. January 20th, 1939. (524049.)

2064. "Telegraphic transmitters." Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. January 20th, 1938. (524057.)

2082. "Induction type electric supply meters." English Electric Co., Ltd., and G. Tilstone. January 20th, 1939. (524061.)

8352. "Radio receiving apparatus." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 18th, 1938. (523881.)

14492. "Superheterodyne radio receivers." Philips Lamps, Ltd. May 17th, 1938. (523883.)

17767. "Polyphase choke coils." Philips Lamps, Ltd. June 20th, 1938. (523885.)

23644. "Variable electric condensers." Philips Lamps, Ltd. August 19th, 1938. (523888.)

27991. "Adjustable electric condensers." Philips Lamps, Ltd. October 18th, 1938. (523890.)

32965. "Method of and means for testing by comparison metals and other heat and electricity conducting materials." J. Zubko. December 28th, 1939. (524072.)

1940

6047. "Radio circuit arrangements employing potential-variable capacity devices." Marconi's Wireless Telegraph Co., Ltd., N. M. Rust, J. D. Brailsford, A. L. Oliver and J. F. Ramsay. November 12th, 1938. (Divided out of 522476.) (523073.)

Telephony in Brazil

THE Brazilian Traction, Light & Power Co., which through affiliated concern controls the telephone undertakings in Brazil, states in its report for last year that the increase in the number of telephones in service in its area during 1939 amounted to 13,266, making a total of 208,633. The company has undertaken to install a 7,000-line automatic unit to give service to the towns of Nictheroy and San Gonçale, and also to connect at specified intervals six other towns in the State of Rio de Janeiro. Throughout the area served by the company the net increase during the year in toll line extensions was 1,608 miles, underground conduit constructed 105 miles, underground cables laid 41 miles, and overhead telephone wires erected 55 miles.

FINANCIAL SECTION

New Companies. Capital Returns. Debenture Charges. Bankruptcies and Liquidations. Reports and Dividends. Stocks and Shares

New Companies Registered

Bowthorpe Engineering Co., Ltd.—Private company. Registered August 15th. Capital, £3,600. Objects: To acquire the business of engineers and manufacturers of electrical and other equipment now carried on at Croydon by J. Bowthorpe and R. A. Parsons as the Bowthorpe Engineering Co. Directors: J. Bowthorpe, 4, Chaldon Way, Coulsdon, Surrey; A. G. C. Lloyd, Strawberry Cottage, Fulmer, Bucks (directors of Bowthorpe Electric Co., Ltd.); R. A. Parsons, 56, Hawkhurst Way, W. Wickham (director of Hellermann Electric, Ltd.); H. C. Haldane, 76, Palace Gardens Terrace, W.8 (director of Park Trust, Ltd.). Secretary: F. S. Brenchley. Registered office: 6, Brewer Street, Oxford.

Purchase Facilities, Ltd.—Private company. Registered in Dublin, August 3rd. Capital £100, £1 each. Objects: To carry on the business of financiers for the sale (for cash or on credit), or on instalment plan, hire purchase or otherwise of radio gramophones, telephone apparatus and installations, &c. The subscribers are: K. Keane, 35, Lower Mount Street, Dublin, and J. W. Gorman, 20, Lansdowne Park, Dublin.

Browning's Electric Company, Ltd.—Capital £1,000. Factors, manufacturers and repairers of and dealers in electrical goods of all kinds, dynamos, motors, armatures, batteries, &c. Directors: Wm. H. Browning (permanent governing director), and R. W. Browning. Registered office: Imperial Works, St. Martin's Avenue, East Ham, E.6.

Companies' Returns

Statements of Capital

Mather & Platt, Ltd. — Capital, £2,500,000 in £400,000 preference stock, £1,363,660 ordinary stock, and 736,340 shares of £1. Return dated March 8th. All stock taken up. £630,660 paid on £292,000 preference and £338,660 ordinary stock. £1,133,000 considered as paid on £108,000 preference and £1,025,000 ordinary stock. Mortgages and charges nil.

Lancashire United Transport & Power Co., Ltd.—Capital, £600,000 in 300,000 preference and 300,000 ordinary shares of £1. Return dated March 14th. 300,000 preference and 276,208 ordinary shares taken up. £101,306 paid. £474,902 considered as paid. Mortgages and charges: £244,275 mortgage debenture stock. A further £50,000 of the stock has been deposited as security for possible advances.

Alton District Electricity Co., Ltd.—Capital, £35,000 in £1 shares. Return dated March 21st. All shares taken up. £35,000 paid. Mortgages and charges nil.

Northampton Electric Light & Power Co., Ltd.—Capital, £1,000,000 in £925,000 stock and shares and £75,000 preference stock and shares. Return dated March 22nd. £52,500 preference and £870,000 ordinary stock taken up. £922,500 paid. Mortgages and charges £600,000.

Loch Leven Electricity Supply Co., Ltd.—Capital, £10,000 in £10 shares. Return dated March 28th. 500 shares taken up. £5,000 paid. Mortgages and charges nil.

Electrical Agencies (London), Ltd.—Capital, £1,000, in £1 shares. Return dated January 30th (filed February 28th), 1940. All shares taken up. £1,000 paid. Mortgages and charges: nil.

Chasetown & District Electricity Co., Ltd.—Capital, £100,000, in £1 shares. Return dated April 11th, 1940. 63,130 shares taken up. £1,000 paid. £62,130 considered as paid. Mortgages and charges: nil.

Mortgages and Charges

Bennie Lifts, Ltd.—Second debenture, charged on first floor of 2, Tinworth Street, S.E.11, and the company's undertaking and other property, present and future, including uncalled capital, dated August 7th, 1940, to secure £3,000. Holders: Westminster Bank, Ltd.

Ilco, Ltd.—Satisfaction to the extent of (1) £800 on July 29th, 1940, of mortgage dated December 31st, 1925, and (2) to the extent of £200 on same date of charge dated April 30th, 1937, and registered January 29th, 1940.

Clang, Ltd.—Satisfaction in full on September 17th, 1935, of debenture in favour of Barclays Bank, Ltd., dated January 27th, 1934, and registered February 1st, 1934. According to the register of mortgages the debenture registered February 1st, 1934, originally secured all moneys due to bank. (Notice filed August 6th, 1940.)

Rainsford & Lynes, Ltd.—Debenture charged on 113-131 (odd numbers), Emily Street, Birmingham, and the company's undertaking and other property, present and future, including uncalled capital, dated August 2nd, 1940, to secure all moneys due or to become due from the company to Lloyds Bank, Ltd.

Company Liquidations

Bannister, Son & Co. (Croydon), Ltd., radio and electrical dealers, 64, George Street, Croydon.—At the statutory meeting of creditors a statement of affairs was submitted showing liabilities of £2,915 and total assets of £3,174. The issued capital was £6,000. The shareholders had previously met and passed a resolution appointing Mr. A. Lester Boddington, of Ludgate Hill, London, E.C., as liquidator. A committee was nominated to act with Mr. Boddington.

West Lancashire Refrigeration Co., Ltd.—Winding up voluntarily. Liquidator, Mr. G. W. Street, 33, Blackfriars Street, Manchester.

Forward Electric Co., Ltd.—Meetings, pursuant to section 244 of the Companies Act, 1929, September 17th, at the Chamber of Commerce, New St., Birmingham, to receive an account of the winding up within the preceding twelve months by the liquidator, Mr. A. Cripwell.

Bankruptcy Proceedings

B. Ereira, company director, "Fleetwood," Edgware Road, Cricklewood.—Heavy loss sustained in respect of a large consignment of defective torch batteries, coupled with adverse trading conditions caused by the war, were given as the causes of his failure by this debtor, who failed last month with liabilities of £168 against assets £6. He attended on August 14th before Mr. Registrar Stiebel at the London Bankruptcy Court for public examination, and stated that in February, 1939, he formed a limited company to deal in radio and electrical apparatus, repairs and installations, and acted as sole director at a salary of £6 a week. In April, 1940, judgment for £60 was recovered against him under a guarantee in respect of goods supplied to the company, and these bankruptcy proceedings followed. The examination was concluded.

E. E. Garfield, electrician, 49, Ormond Street, Aston, Birmingham.—First meeting August 23rd at 37, Temple Street, Birmingham. Public examination, October 2nd at the Court House, Birmingham.

Reports and Dividends

Aron Electricity Meter, Ltd., reports a trading profit for the year ended March 31st of £3,157, as compared with £52,142 for 1938-39, and after making various appropriations there is a loss of £3,950, as compared with a profit of £39,434. From taxation equalisation £10,000 is drawn, and after placing £16,632 to income tax there is a net loss of £10,582, reducing the balance of £14,719 brought in to £4,137.

The report states that the net loss on trading is mainly due to the reduction in the demand for electricity meters brought about by the war, and by the uncertain outlook prior to the war, but it is also partly due to the heavy preliminary expenses of adapting the company's factory to war production from which no material benefit was received during the year of account. The company has in hand large orders and in addition continues to receive its full proportion of the reduced demand for electricity meters.

During the year the sale of the "Austrian" company was completed, and as the proceeds could not be remitted from Germany they were invested in first-class German industrial and public utility services. Under present conditions the value of these investments is problematical, and from capital reserve £8,385, book value of the Austrian company, has been written off.

James Howden & Co., Ltd.—Presiding at the annual meeting on August 16th, Mr. C. W. Hume (chairman) said that while it was inopportune at present to give details of the work during the year under review they were very busy and the record order book of last year had been considerably surpassed.

Richardsons, Westgarth & Co., Ltd., report a trading profit for the year to March 31st of £170,575, which with other receipts makes £174,747, as compared with £175,760 for the preceding year. The net balance is £103,982 (against £104,432), and the dividend for the year is again 7½ per cent. The balance carried forward is £89,417, as compared with £11,862 brought in.

Rawlings Bros., Ltd., report a net profit for the year ended March 31st of £5,691, as compared with £8,099 for the preceding year. The ordinary dividend for the year is maintained at 7½ per cent., but for 1938-39 a bonus of 2½ per cent. was also paid. The balance carried forward is £3,736 (against £5,464 brought in).

Davey Paxman & Co. (Colchester), Ltd., report a trading balance for the year to March 31st of £29,639, as compared with £24,157 for the preceding year. After deducting directors' fees, debenture and other interest, &c., N.D.C., income-tax, and E.P.T., &c., it is proposed to pay a dividend of 15 per cent. for the year (same) and to carry forward £8,531 (against £11,919 brought in).

The London Electrical & General Trust reports a revenue for the year to June 30th of £54,022 and a net balance of £32,649 (against £33,603). The final ordinary dividend is 3½ per cent., maintaining the distribution for the year at 5½ per cent., and £14,897 is carried forward (against £14,348 brought in).

George Kent, Ltd., report a net profit for the year ended March 31st of £20,312, as compared with £33,607 for 1938-39, less debenture sinking fund. The final ordinary dividend is 6 per cent., making 9 per cent. for the year (against 10 per cent., plus a bonus of 2½ per cent.), staff funds receive £3,500, and £40,812 is carried forward (against £41,391 brought in).

Thorn Electrical Industries, Ltd., report a combined trading profit for the year to March 31st of £42,161, as compared with £48,833 for the previous year and a net profit of £24,263 (against £35,058). The ordinary dividend for the year is maintained at 20 per cent., reserve receives £15,000, and £7,823 is carried forward (against £11,916 brought in).

Waite & Son, Ltd., are paying a first and final dividend of 2 per cent. (unchanged).

Thomas De La Rue & Co., Ltd., are paying a final dividend of 9 per cent., making 15 per cent. for the year (same). The cash bonus, however, is lowered from 11 per cent. to 6 per cent., so that the total distribution is 21 per cent. (against 26 per cent.).

The Clyde Valley Electrical Power Co. has declared an interim dividend of 3 per cent. (same).

Ransomes & Rapier, Ltd., have declared an interim dividend of 3 per cent. (against 2½ per cent.).

The County of London Electric Supply Co., Ltd., has declared an interim ordinary dividend of 3 per cent., actual, less tax (unchanged).

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange business has run on very quiet lines. There has been little or nothing fresh to energise vitality. Public interest remains at a comparatively low ebb, but prices keep firm in practically all departments. The withdrawal of our forces from British Somaliland caused neither surprise nor depression. It had been expected, and, from the point of view of Stock Exchange prices, not a single stock or share was unfavourably affected. There remains a consistently steady demand for the best class Industrials. People who try to buy stocks and shares in almost any market find, often to their annoyance, that the supply is so limited that they are unable to carry out their intentions. Amongst this week's few features, rises in Cable and Wireless stock stand out.

Home Railways and the Government

Upon its becoming known that the possibility of a further upward revision of railway charges is under review, prices of home railway stocks made a fairly general improvement. So quickly did opposition to the proposal develop, however, that the original agreement between the Government and the companies seems to be in some danger. The effect has been to render more sensitive than ever the market in Home Railway stocks. Investment looks at them askance.

From our own tables it cannot have escaped notice that Southern Railway 5 per cent. preferred stock has been standing for weeks past at prices that allow of a yield exceeding 10 per cent. on the money. The pact between the Government and home railways is taken to assure due payment of the dividend on this issue during the war period—always asuming that air-raid damage keeps within certain prescribed bounds. If the agreement does collapse, home railway prices will probably follow suit, but the companies are so indispensable to the national cause that there can be no question as to the Government control—and guarantee of earnings—being continued in one shape or another. Southern Railway stocks are unchanged on the week. So, also, are those of the London Passenger Transport Board.

Dealing at Denham

Air raids have brought prominently to the front the arguments used for and against the removal of the Stock Exchange from London to Denham. The fact is that the Stock Exchange has taken an option over properties at Denham; and that, on the decision of no more than two members out of the full Committee—thirty in number—members, clerks and everybody connected with Stock Exchange work will be invited to move into Bucks.

Should it ever become necessary to evacuate the Stock Exchange, a new set of temporary rules will come into operation. It is thought that a minimum period of three weeks will be required to start up the fresh machinery. One of the new rules empowers the Stock Exchange Committee to suspend completion of bargains outstanding at the time of the exodus. Suspension, it may be remarked, is a different thing altogether from cancellation. No European war would be allowed to shake the Stock Exchange rule—printed in no book, but commanding unquestioned acquiescence—that a bargain is a bargain, to be carried through on the principle of the Stock Exchange motto, *Dictum meum pactum.*

Price Fluctuations

The principal movements this week are rises in Cable and Wireless 5½ per cent. preference and ordinary stocks. Attention is becoming directed to both of these because of the high yields that they afford, and, as already mentioned, rumour says that the combine's returns are keeping up remarkably well. Scarcity of stock makes an additional factor in helping to maintain the prices of the securities.

In the Electric Supply group, Bournemouth and Poole have eased off a little on the lowering of the interim dividend, and Electric Supply Corporation, at 37s. 6d., are also 1/16 down by way of precaution against a possible reduction of the distribution. Clyde Valley shares are 2s. up at 30s. London Associated have further recovered to 15s. Business in British Electric Traction deferred has been done up to 590, the argument being that at anything under 600 the stock can be deemed a reasonable invesment, seeing that at 600 the yield would be 7½ per cent. on the 45 per cent. dividend recently distributed. Associated Electrical ordinary have declined to 35s. Murex at 3½ show a gain of 2s. 6d., and Walsall Conduits 4s. shares at 23s. 9d. are similarly better. Improvements have occurred in Tube Investments, Reyrolle, Mather and Platt and Ever Ready shares. The general trend of Industrials is steady, and the market as a whole is good, for which the principal reason is the reluctance of investment to part from stocks and shares at a time when their suitable replacement is anything but easy.

North Metropolitan Power Station

The North Metropolitan Power Station Company, Ltd., controlled by the Northmet Power Company, owns electrical generating stations at Willesden and Brimsdown. These are leased to the Northmet Power Company until the year 2025 at rentals which together will cover the interest and sinking fund in respect of the Power Station Company's debenture stocks and all money borrowed to finance extension of stations.

The 5 per cent. debenture stock stands at 101, at which there are buyers. It is redeemable by purchases up to, or by drawings at 100 by means of a sinking fund of 1½ per cent. now in operation. This serves, naturally, to keep the price of the stock close to the 100 at which the company has the right to redeem the issue.

Both the company's 3½ per cent. debenture stocks—one dated 1963, the other two years later—stand about 91, and stock can be bought at that price, or a little lower. Interest is payable on the 1st March and September. Both are redeemable by means of a sinking fund commencing 1940 in the first case, and 1942 in the second, by purchase up to, or by drawings at 100. These debenture stocks are well covered by assets.

The 3½ per cents. give a return at the present price of £3 17s. ex the interest due on the 1st of next month. The 5 per cent. stock, liable to repayment at 100, yields £4 19s. at 101, but there is, of course, to be taken into account the risk of the stock being redeemed at 100, whereas with the 3½ per cent. debenture stocks repayment in their case would be made at a premium over the current market quotation. Allowance for repayment at 100 of the 1963 issue at due date will make the yield £4 2s. 6d.; the 1965 stock, if it runs its full term, will give £4 0s. 3d. to redemption.

Victoria Falls Preference

In the Victoria Falls and Transvaal Power Company there is an issue of £2,000,000 in 6 per cent. cumulative participating preference shares of £1 each, which are now quoted at 32s. 6d. The shares participate up to 10 per cent., and for years past have received the full amount. At 32s. 6d. the yield on the money is £6 3s. per cent., a handsome return from shares that are practically gilt-edged. The snag is, however, the fact that under a licence granted by the Governor General of the Union of South Africa he can give in 1948 two years' notice of intention to expropriate the undertaking on payment of a fair value at that time. In the event of expropriation, the amount realised would be used to pay off the preference shares at their par value of £1, the rest of the money going to the ordinary shareholders.

Insurance Against Risks

Accordingly, there is just the chance of these preference shares being paid off in ten years' time at 20s. Facing this risk, investment looks to receive a fairly high rate of yield by way of compensation, or insurance, against possibilities. What is likely to happen in 1950 nobody can tell. Efforts have been made over and over again to induce the directors, or the South African authorities, to give some kind of lead that shall throw a definite light upon probabilities, but nothing certain has ever transpired. This risk it is which renders investment a little diffident about putting money into shares that, in ten years' time, may possibly be redeemed at less than two-thirds of the price they now command.

Mutual Insurance

Five times out of six the would-be buyer of such front-rank Industrial shares as those in which there is no free market finds to-day that the execution of his order presents no little difficulty. Some people discriminate in their investments between those in companies whose physical assets are liable to be affected by air-raid damage, and those which are not. Even in these cases, however, the prejudice in favour of companies in "safe" areas is rapidly disappearing. The impression grows, however, that sooner or later Parliament will be obliged to grasp the nettle which it has hitherto succeeded in evading, and will lay down some comprehensive scheme of mutual insurance against air-raid damage.

The argument in favour of such a course is obvious, but presumably the Government has hesitated to deal with it in wholehearted fashion owing to the wide scope of the subject. When it comes to be applied, as is certain to be the case before the end of the war, then the last objection will be removed to the purchase of shares in companies whose present performance, allowing for E.P.T. and N.D.C., still admits of the investor receiving a living rate of return upon capital invested in the shares.

Hall Telephone

It will be noticed in the list prices overleaf that a fall of 2s. 6d. has occurred in Hall Telephone 10s. shares. The price has gone back from 11s. 3d. to 8s. 9d. This makes another example of the misleading character of many of the official quotations which are sent out by the Stock Exchange, certainly without any wish to mislead, but simply because in the absence of business no recent transaction has tested the actual market value. For some time past, Hall Telephone shares have been quoted at about 11s. 3d., but when a seller appeared a few days ago buyers were found to be lacking, and the price accordingly had to be marked down. The fall served one good purpose, in that it brought in a few buyers. On the basis of the last-paid dividend of 10 per cent., the yield on the money at 8s. 9d. is £11 8s. 6d. per cent.

The last published report and accounts showed that at December 31st, 1939, the company had £495 cash, as against £28,900 at the end of 1938 and £71,900 in December, 1937. The company came out about 11 years ago and took over the business of a firm of makers of telephone equipment. In 1933 and in 1936 new shares were issued by way of rights at 15s. per share. In June, 1937, further shares were issued at 11s. per share.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1940 High-est	1940 Low-est	Dividend Pre-vious	Dividend Last	Middle Price Aug. 20	Rise or Fall	Yield £ s. d.
Home Electricity Companies							
Bournemouth and Poole	63/6	41/6	15	15	41/3	−½	—
British Power and Light	30/–	21/–	7	7	21/6	...	6 10 4
City of London	28/–	20/–	7½	7½	21/6	+6d.	6 19 6
Clyde Valley	38/6	25/–	8	8	30/–	+2/–	5 6 8
County of London	43/3	22/–	10½	10½	27/6	...	7 12 8
Edmundson's:							
7% Pref.	31/6	26/3	7	7	28/3	...	4 19 1
Ord.	27/6	18/6	9	6	21/6	...	5 11 7
Elec. Dis. Yorkshire	40/3	32/6	9	9	32/6	...	5 10 9
Elec. Fin. and Securities	41/3	38/6	12½	12½	38/9	...	6 9 0
Elec. Supply Corporation	46/3	37/–	12	11½	37/6	−½	6 2 8
Isle of Thanet	16/–	5/6	4	4	6/–	...	13 6 8
Lancs Light and Power	33/–	25/–	7½	7½	26/3	...	5 14 3
Llanelly Elec.	21/–	17/–	5½	5½	18/–	...	6 2 2
Lond. Assoc. Electric	21/–	12/6	7	5½	15/–	+½	—
London Electric	37/6	19/–	8	7	20/–	...	7 0 0
London Power Deb. Red.	105½	101	5	5	101½	...	4 18 6
Metropolitan	41/6	23/6	12	10	28/3	...	7 1 6
Midland Counties	39/–	24/3	8	8	27/6	...	5 16 5
Mid. Elec. Power	40/–	29/6	9	9	31/3	...	5 12 2
Newcastle Elec.	29/9	24/6	7	7	24/6	...	5 14 3
North Eastern Electric:							
Ordinary	31/6	17/6	7	7	22/6	...	6 11 9
7% Pref.	32/6	26/6	7	7	27/6	...	5 1 10
Northampton	48/–	39/–	10	10	38/9	...	5 3 3
Notting Hill 6% Pref. (£10)	10⅞	9	6	6	9	...	—
Northmet Power:							
Ordinary	42/3	23/–	10	10	27/6	...	—
6% Pref.	29/–	23/–	6	6	26/–	...	4 12 4
Richmond Elec.	24/6	18/–	7	6	20/–	...	—
Scottish Power	38/–	24/–	8	8	28/3	...	5 13 4
Southern Areas	21/3	13/9	5	5	13/9	...	7 5 6
South London	23/3	20/–	7	7	20/–	...	7 0 0
West Devon	20/–	18/6	5	5	20/–	...	5 0 0
West Glos.	21/3	15/–	2½	4½	16/3	...	5 13 10
Yorkshire Elec.	40/–	24/6	8	8	28/9	...	5 11 5
Overseas Electricity Companies							
Atlas Elec.	4/–	1/3	Nil	Nil	1/9	...	—
Calcutta Elec.	37/–	22/6	10*	8*	27/6	...	5 18 6
Cawnpore Elec.	30/–	24/–	10	10	25/–	...	8 0 0
East African Power	25/6	20/–	7	7	20/–	...	7 0 0
Jerusalem Elec.	24/–	17/9	7	7	18/9	...	7 9 4
Kalgoorlie (10/–)	12/6	9/6	7½	7½	11/–	...	6 16 5
Madras	26/9	25/–	8*	6*	25/–	...	4 16 0
Montreal Power	35½	30	1½	1½	32	...	—
Palestine Elec. "A"	25/–	13/–	5*	Nil	13/9	...	—
Perak Hydro-electric	20/3	13/6	6	2½	13/9	...	3 12 9
Shawinigan Power	27½	19	83cts.	90cts.	20½	...	—
Tokyo Elec. 6%	69	52	6	6	52½	...	11 8 6
Victoria Falls Power	75/9	56/–	15	15	63/9	−½	4 14 1
Whitehall Investments Pref.	17/9	8/–	7½	7½	9/6	...	15 16 0
Public Boards							
Central Electricity:							
1950–70	110½	104	5	5	104½	...	4 15 8
1955–75	112½	106	5	5	106½	...	4 14 0
1951–73	107½	102	4½	4½	102½	...	4 7 10
1968–93	96½	90	3½	3½	90	...	3 17 9
London Elec. Trans Gtd.	92	87½	2½	2½	89	...	2 16 2
London & Home Counties							
1955–75	113¾	105	4½	4½	105½	...	4 5 4
Lond. Passenger Transport							
A	116	104	4½	4½	107	...	4 4 0
B	116	102½	5	5	104½	...	4 15 8
C	65½	25	1½	1½	28	...	5 7 2
West Midland Joint Elec.							
1948–68	106½	105	5	5	105½	...	4 14 9
Telegraph and Telephone							
American Tel. & Tel.	215	180	9	9	190	...	4 14 9
Anglo-Am. Tel.:							
Pref.	106	85	6	6	87	...	6 18 0
Def.	23⅜	18	1½	1½	18½	...	8 2 2
Anglo-Portuguese	22/6	10/–	8	8	11/3	...	14 4 6
Cable & Wireless:							
5½% Pref.	99½	70	4½	5½	86	+4	6 8 0
Ord.	65	28½	4	4	48	+3½	8 5 0
Income	99¾	93	...	...	97	...	4 2 4
Canadian Marconi $1	6/–	4/–	Nil	4cts.	4/3	...	—
Globe Tel. & Tel.:							
Ord.	32/6	21/6	7½*	6*	25/–	...	4 16 0
Pref.	22/9	22/6	6	6	23/9	...	5 1 1
Great Northern Tel. (£10)	20	11	20	20	12½	...	—
Inter. Tel. & Tel.	5½	3	Nil	Nil	3	...	—
Marconi-Marine	30/–	18/3	10	7½	18/9	...	8 0 0
Oriental Telephone Ord.	2⅞	48/–	12*	11½*	2½	...	4 12 0
Telephone Props.	15/–	11/–	5	6	12/6	...	9 12 0
Telephone Rentals (5/–)	9/6	5/9	10	10	5/9	...	8 14 0
Traction and Transport							
Anglo-Arg. Trams:							
First Pref. (£5)	4/3	1/3	Nil	Nil	2/–	...	—
4% Inc.	11½	2	Nil	Nil	3½	...	—
British Electric Traction:							
Def. Ord.	830	440	5	45	590	+65	7 12 7
Pref. Ord.	169	134	8	8	140	...	5 14 3
Bristol Trams	48/6	34/6	10	8*	35/–	...	—
Brazil Traction	12¼	5½	$1	50c.	5½	...	—
Calcutta Trams	24/–	16/3	8	5½	17/–	...	6 9 4
Cape Elec. Trams	18/6	16/–	5	5	17/–	...	5 17 8
Lancs Transport	35/–	27/6	10	10	30/–	...	6 13 4
Mexican Light:							
1st Bonds	33	27	5	5	27½	...	—
Rio 5% Bonds	90	74	5	5	80	...	6 5 0
Southern Rly.:							
5% Prefd.	79	35	5	5	46	...	10 17 4
5% Pref.	104½	60	5	5	77	...	6 9 10
T. Tilling	45/9	31/–	10	10	32/6	+½	6 3 0
Tilling & B.A.	47/6	43/9	9*	8*	45/–	...	—
West Riding	35/–	26/–	10	10	27/–	+1/–	7 8 2
Equipment and Manufacturing							
Aron Electricity Ord.	17/6	10/–	15	Nil	10/–	...	—
Assoc. Elec.:							
Ord.	43/3	27/–	10	10	35/–	−½	5 14 4
Pref.	35/3	32/3	8	8	33/9	...	4 14 10
Automatic Telephone & El.	47/3	32/–	12½	12½	35/–	...	7 2 10
Babcock & Wilcox	50/–	28/6	10	11	32/6	...	6 15 4
British Aluminium Ord.	56/–	33/–	12½	12½	34/6	+½	6 5 0
British Insulated Ord.	92/6	67/–	20	20	72/6	...	5 10 4
British Thermostat (5/–)	14/9	6/6	18½	18½	7/6	...	12 6 8
British Vacuum Cleaner(5/–)	12/6	6/3	40	12½	6/3	...	10 0 0
Brush Ord.	4/6	2/–	Nil	Nil	2/6	...	—
Callender's	69/–	46/–	15	15	50/–	...	6 0 0
Chloride Elec. Storage	72/6	55/–	15	15	2⅞	...	5 4 4
Consolidated Signal	72/6	59/–	36½	17	60/–	...	5 13 4
Crabtree (10/–)	24/9	17/6	17½	17½	20/–	...	8 15 0
Crompton Parkinson:							
Ord. (5/–)	20/–	12/6	30	20	15/–	...	6 13 4
E. K. Cole (5/–)	5/–	2/6	10	Nil	3/–	...	—
Elec. & Musical Industries (10/–)	10/3	4/3	5	Nil	6/3	+3d.	—
Electric Construction	36/3	30/–	13½	10	30/–	...	6 13 4
Enfield Cable Ord.	56/–	40/6	25	16½	45/–xd.	+1/–	7 13 0
Electrical Switchgear (10/–)	22/6	20/–	16	10	20/–	...	5 0 0
English Electric	33/9	16/6	10	10	22/6	...	8 18 0
Ensign Lamps (5/–)	15/3	13/9	25	25	13/9	...	9 1 10
Ericsson Tel. (5/–)	39/3	25/–	25*	25*	25/–	...	5 0 0
Ever Ready (5/–)	28/3	17/3	30	40	23/6	+1/–	8 10 2
Falk Stadelmann	18/3	12/6	6	7	13/9	...	8 14 6
Ferranti Pref.	25/–	23/–	7	7	25/–	...	5 12 0
G.E.C.:							
Pref.	32/6	27/–	6½	6½	28/9	...	4 10 6
Ord.	83/3	56/–	20	20	68/9	...	5 16 3
Greenwood & Batley	25/6	20/–	15	13	20/–	...	13 0 0
Hall Telephone (10/–)	18/6	8/9	15	10	8/9	−⅛	11 8 6
Henley's (5/–)	21/6	13/6	20	20	16/3	...	6 3 1
4½% Pref.	21/3	20/6	4½	4½	21/3	...	4 4 8
Hopkinsons	46/9	33/6	12½	15	35/–	...	8 11 6
India-Rubber Pref.	21/–	20/–	5½	5½	20/9	...	5 6 0
Intl. Combustion	121/3	70/–	32½	32½	4	...	8 2 6
J. Lucas	60/6	40/–	15	15	47/6	...	6 6 4
Johnson & Phillips	50/9	33/–	12½	15	37/6	...	8 0 0
Lancashire Dynamo	59/9	47/6	25	20	47/6	...	8 8 5
Laurence Scott (5/–)	11/–	6/–	15	15	8/–	...	9 7 6
London Elec. Wire	25/6	20/–	7½	7½	22/6	...	6 13 4
Mather & Platt	46/6	30/–	13½	10	32/6	+½	6 3 1
Metropolitan Elec. Cable Pf.	22/–	21/3	5½	5½	21/3	...	5 3 6
Murex	86/9	52/6	20	20	70/–	+½	5 14 4
Pye Deferred (5/–)	9/–	6/9	25	25	8/–	...	15 12 6
Revo (10/–)	20/9	12/6	17½	5	12/6	...	4 0 0
Reyrolle	60/6	41/–	12½	12½	42/6	+½	5 17 8
Siemens Ord.	23/9	16/3	7½	7½	17/6	...	8 11 6
Strand Elec. (5/–)	2/3	9d.	10	4	1/3	...	10 0 0
S. Smith (1/–)	8/–	3/6	37½	50	3/9	...	13 6 8
Switchgear & Cowans (5/–)	11/9	5/6	20	10	6/3	...	8 0 0
Telegraph Condenser (10/–)	8/9	6/3	5	—	8/9	...	—
Telegraph Construction	42/6	29/–	10	10	30/0	...	6 13 4
Telephone Mfg. (5/–)	9/–	5/–	9	9	5/6	...	8 3 8
Tube Investments	96/9	61/3	23¾	23¾	78/9	+½	6 1 2
Vactric (5/–)	3/6	2/–	4	Nil	2/3	...	—
Vickers (10/–)	22/–	9/6	10	10	13/–	+3d.	7 13 10
Ward & Goldstone (5/–)	19/9	12/6	20	20	12/6	...	8 0 0
Westinghouse Brake	46/–	32/9	17½	10	32/6	...	6 3 1
Walsall Conduits (4/–)	26/6	17/6	55	55	23/9	+½	9 0 0
West, Allen (5/–)	7/–	3/–	10	7½	3/9	...	10 0 0

* Dividends are **paid free** of Income Tax.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), Great George Street, London, S.W.1.

Argentina.—BUENOS AIRES.—September 16th. Argentine National Sanitation Works Department. Eleven electrically driven centrifugal deep-well pumping sets. (T. 21205/40.)*

Australia. — SYDNEY. — October 24th. County Council. One 50,000-kW steam turbo-alternator set for the Bunnerong power station. (T. 16057/40.)*

MELBOURNE.—September 10th. Deputy Director, Posts and Telegraphs. Underground cable. (T. 21127/40.)*

September 3rd. Transmitters. September 5th. Condensers and receivers. (T. 21223/40.)*

State Electricity Commission. October 15th. 4,000 ft. of cable for use on a three-phase 6.6-kV system. (T. 21227/40.)*

Dundee.—August 24th. Emergency Committee. Electric lighting installations at 53 air-raid wardens' posts. Particulars from city quantity surveyor, 21, City Square; tenders to town clerk.

Egypt.—CAIRO.—September 4th. Ministry of Education. Weaving machines with electric motors for trade school (voltage 220 DC). (T. 21229/40.)*

Gateshead.—August 24th. Electrical installation at Shipcote Baths. Tenders to borough engineer (deposit £5 5s.).

Gloucester.—August 29th. Corporation. Electrical installation at new maternity hospital. (July 19th.)

Manchester.—September 14th. Waterworks Committee. Three electrically driven centrifugal pumps, with motor starters, pipes, valves, &c., for Denton Reservoirs. (See this issue.)

Middlesbrough.—Town Council. Installation of new electric wiring at the police headquarters. Plans by the borough electrical engineer.

New Zealand. — WELLINGTON.—October 8th. Public Works Department. 20,000-kVA synchronous condenser with control and protective equipment. (T. 21199/40.)* Four 2,500-kVA transformers or alternatively eight 1,677-kVA transformers. (T. 21197/40.)*

October 15th.—66-kV outdoor switchgear and steelwork for Winton substation. (T. 21206/40.)*

South Africa.—PRETORIA.—Union Tender and Supplies Board. October 3rd. Distribution boards, switches and fuses, and switch boxes. (T. 21239/40.)*

September 19th. Seven electric passenger lifts, two electric goods lifts and three electric service lifts at the new G.P.O. Building, Cape Town. (T. 21012/40.)*

October 10th. Public Works Department. Laundry machinery, including electric motors, for Krugersdorp Mental Hospital. (T. 21352/40.)*

CAPE TOWN.—September 5th. Electricity Department. Thirty-two 6-ft., eight 4-ft. and 56 2ft. double-tier heaters for the wards of the Infectious Diseases Hospital. (T. 20785/40.)*

October 8th. Electricity Supply Commission. Two 2,000-kVA transformers. (T. 21222/40.)*

Warrington.—September 2nd. Electricity Department. Cables, twelve months' supply of earthenware conduits, cable protection slabs, tiles and covers. (See this issue.)

West Riding.—County Council. Wiring for electric lighting and power of a proposed wireless station for the police department. County architect, County Hall, Wakefield.

Orders Placed

Aberdeen.—Town Council. Accepted. Electrical fittings, plumbers' materials and brass furnishings required by the Streets and Works Department for the three months August to October.—William Wilson and Co. (Aberdeen), Ltd.

Barrow-in-Furness.—Electricity Committee. Accepted. Substation switchgear.—B.T.H. Co. Switchgear.—Met.-Vickers Electrical Co.

Coventry.—Electricity Committee. Accepted. Switchgear (£1,289).—Switchgear and Cowans.

Middlesbrough.—Town Council. Accepted. Electric lighting of staff shelter (£178).—H. G. Sproates.

Shropshire.—Health Committee. Accepted. Electric water pump for Prees Heath sanatorium.—Wyatt Bros.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Public shelters, twelve sites; H. Sanderson, borough surveyor, Town Hall.

Alfreton.—Shelters for 800 persons, for U.D.C.; R. F. Ward, surveyor, Council Offices.

Bangor (NORTH WALES).—Public, domestic, communal and basement shelters; borough engineer.

Barnet.—Surface shelters (£14,500), for the Urban District Council; Surveyor's Department, Ravenscroft House, Wood Street.

Beckenham. — Brick surface shelters (1,650 persons); J. Dove, borough engineer, Town Hall, Beckenham, Kent.

Billingham-on-Tees.—Additional office and recreation accommodation at fire station, for U.D.C.; Stephen Coates, Ltd., builders, Langburgh Place, Middlesbrough.

Blackwell.—Shelters for R.D.C.; A. H. Elliott, Dale Close, Chesterfield Road South, Mansfield.

Bodmin.—Pumping station for Waterworks Co.; N. Phillips, secretary, Lamorna, Castle Street, Bodmin.

Boldon (Co. DURHAM).—Air-raid shelters for Urban District Council; Roland Clarkson, Stratford House, East Boldon; J. Wilson, builder, East Boldon; and Gordon Durham, Ltd., Boldon Lane, East Boldon.

Bolton.—Mill extensions for Hy. Whitehurst & Sons, Ltd.; T. E. Smith & Son, architects.

Burnley.—Shelters for 6,360 persons; J. L. Beckett, surveyor, Town Hall.

Cardiff.—Three new buildings, for cleansing units; G. H. Whitaker, city architect, City Hall.

Cheshire.—A.R.P. shelters (£30,000), improvements to Springfield Road School, Sale (£2,500), and two police houses (£1,500); county architect.

Coventry.—Houses on the Canley site; T. Bates and Son, builders, 53, Warwick Street.

Darlaston. — Houses; Seaman Bros., builders, 49, Perry Street.

Dartford.—Factory; Joseph Wells & Sons, Ltd.

Devonshire. — Conversion of hospital into isolation hospital (£2,600); H. V.

(*Continued on next page*)

Large Asiatic Power Plant

Hydro-electric Development in Manchukuo and Chosen

A CORRESPONDENT in Eastern Asia reports that a generating set with a capacity of 100,000 kVA, constructed at the Tsurumi works of the Tokyo-Shibaura Electric Co., which is technically allied with the General Electric Co. of America, is being installed at the Suiho hydro-electric power station in Chosen, some little distance up the Yahu River from Hsinchow.

The river, which runs between Chosen and Manchukuo, provides a vast potential source of power which, when fully utilised, is expected to achieve even greater results than the Boulder Dam. Power will be supplied to some of the principal cities and industrial centres, notably Anshan and Antung, and as far away as Dairen in Manchukuo. Large as the project is, it is only part of the programme of electric power supply in Manchukuo which began in 1939 and which aims at providing an aggregate capacity of 1,987,500 kW of generating plant. Another station is to be constructed at a point along the Second Sungari River, whose water-power plant will amount to about 810,000 kW, while steam plant will be increased from the present 601,400 kW to 1,177,500 kW.

Due to the difference in frequency between Manchukuo and Chosen the new plant constructed by the Tokyo-Shibaura Electric Co. is arranged for both 50 and 60 cycles. It is capable of developing 100,000 kVA at 125/150 RPM at 16,500 V, three-phase, with a power-factor of 1-0.9. The generator's total weight is 1,110 metric tons, with a rotor weighing 700 tons and the main shaft 65 tons. Compared with one of the generators at Boulder Dam it is heavier by 20 per cent. and is larger in outside diameter by approximately 10 per cent.

The main exciter has an output of 500 kW, 440 V, and a 15-kW, 220-264-V auxiliary exciter has a second winding for producing AC for operating the turbine governor. This machine is built of Japanese materials throughout, including the main shaft, which weighs 65 metric tons and has a maximum diameter of 1,650 mm.

The Tokyo-Shibaura Electric Co. is also constructing a 15.6/230-kV 50-60-cycle transformer for direct connection to the generator. It is water-cooled and oil-immersed and has a total weight of 230 metric tons, excluding the 80,000 litres of oil used. At 50 cycles the efficiency will be 99.15 per cent. and at 60 cycles 99.19 per cent.

Trade Mark Applications

AMONG recent applications for Briitsh trade marks are the following, objections against any of which may be entered within one month from August 14th.

Sunbeam (lettering and design). No. 610484. Class 8 (IV). Electric dry shavers. Chicago Flexible Shaft Co., Chicago, Ill., U.S.A. (British representatives, Frank B. Dehn & Co., Kingsway House, 103, Kingsway, London, W.C.2.).

Manginsax. No. 612229. Class 9 (IV). Wire of copper, nickel, and manganese alloys for electrical purposes. The Saxonia Electrical Wire Co., Ltd., Roan Works, Roan Street, Greenwich, S.E.10.

de Courcy Hague, county architect, Heavitree Road, Exeter.

Dursley. — Communal shelters for R.D.C.; surveyor, Kingshill House, Dursley, Glos.

Easington.—Fire station, for R.D.C.; surveyor, Council Offices.

Eire.—DUN LAOGHAIRE.—Library and school, Dalkey; T. C. O'Mahony, borough manager.

LISTOWEL.—Filter and pump house, &c., for U.D.C.; P. F. Purcell, engineer, Ashton, Killiney, Co. Dublin.

LONGFORD.—Sinking of wells and erection of pumps at Kiltycreevagh, Cloncowley, and Mostrim, for Board of Health; M. Brady, secretary, County Home, Longford.

Epping.—Seven shelters (50 persons each); J. Stuart, county architect, County Hall, Chelmsford.

Eynsham.—New church of St. Peter, Abbev Field; F. Russell Cox, architect, The Blanket Hall, Witney.

Gateshead.—Alterations to the Deckham Hotel, High Street, for I. Tucker & Co., Ltd.; F. W. Briggs & Son, builders, 408, High Street, Gateshead.

Glamorgan.—Works at Aberdare police station; county architect, Glamorgan County Hall, Cardiff.

Glasgow.—Buildings, Hobden Street; D. Bennie & Sons, Ltd.

Garage extensions, Alexandra Parade; Alexandra Transport Co., Ltd.

Glastonbury.—Shelters; borough engineer.

Hereford. — Extensions to works; Painter Bros., Ltd.

Kerrier.—Sick bay at Oak House, Chapel Street, Redruth; R.D.C. surveyor, 5, Cross Street, Helston.

Lancaster.—Shelters (£6,440); borough surveyor.

Leigh.—Brick shelters at various schools; T. A. Clare, borough engineer, Town Hall, Leigh, Lancs.

Lichfield.—Communal domestic shelters (£5,000); borough engineer, Guildhall, Bore Street.

Lunesdale.—Booster pumphouse for R.D.C.; A. R. Harlow, clerk, Council Offices, Hornby, Lancaster.

Macclesfield.—School shelters (£17,000); borough architect.

Middlesbrough. — Additions, Queen's Square, for the Missions to Seamen; Kitching and Co., architects, 21, Albert Road, Middlesbrough.

Shelter for the Tees Conservancy Commission; P. A. Leith, architect, "Glenshee," Cornfield Road, Linthorpe, Middlesbrough.

Mildenhall.—Houses for R.D.C.; surveyor, King Street.

Nantwich. — Communal shelters for U.D.C.; T. Pritchard, surveyor, Council Offices, Barker Street.

Shelters for R.D.C.; H. Crabtree, surveyor, Council Offices, Pillory Street.

Nelson.—T. J. Smith & Nephew, Ltd., surgical dressings manufacturer, 5, Neptune Street, Hull, have acquired premises for new works.

Newcastle-on-Tyne. — Auxiliary fire station and ambulance station; S. F. Davidson, 17, North Street, Newcastle.

Extensions to mental hospital at Coxlodge (£6,000); E. Thompson, 12, Grey Street, Newcastle-on-Tyne.

Newport (I.O.W.).—Booster plant, Horsebridge Hill (£1,000); borough surveyor.

Houses (8), Melbourne Park; borough engineer.

Northallerton (Yorks.).—Air-raid shelters; H. O. Hillyard, U.D.C. Offices, Northallerton.

Air-raid shelter at fire station; Moody Bros., builders, Northallerton.

Northampton. — Communal shelters (£26,510); borough engineer.

Oakengates (Salop). — Houses, with electrical work; M. S. Lee, surveyor, Council Chambers, Oxford Street.

Paignton.—Houses (12), Marldon Road; Eastley & Co.

Rochdale.—Extensions to fire station (£1,300); borough engineer.

Sheffield.—Waterworks booster station; W. G. Davies, city architect, Town Hall, Sheffield.

Surgery with flat above; Dr. O. Billington, 242, Duke Street.

Stoke-on-Trent.—Workshop, messroom, &c., Park Hall Road; Hilton Gravell, Ltd., Mobberley.

Watford.—Shelters for R.D.C.; Surveyor's Department, 25, King Street.

Maternity and Child Welfare Centre; borough surveyor.

Wellington (Salop).—Houses; Idwal Roberts, surveyor, Walker Street.

West Hartlepool.—Shelter at schools; C. M. Yuill, builder, West Hartlepool.

Wetherby.—Fire station for R.D.C.; T. V. Gray, surveyor, Council Offices.

Wirral.—Shelters (£12,000); surveyor, Telegraph Road, Heswall.

Worcestershire. — Shelters (£125,000); county architect, 38, Foregate Street, Worcester.

Municipal Electrical Reports

Satisfactory Results in Difficult Circumstances

Kingston-upon-Hull

AN interesting chart included in the annual report of Mr. D. Bellamy, general manager of the Hull Electricity Department, shows the hypothetical trend of output under normal conditions. Based upon the trend of output in the previous year, the reduction due to war conditions is estimated at 35 million kWh, representing roughly £100,000. As all fixed costs to meet this increased output had already been incurred, approximately two-thirds of this sum was a direct loss.

Altogether 231.0 million kWh was sold last year, and the fact that this was only 1.1 million kWh less than in the previous year must be regarded as very satisfactory for an East Coast town under prevailing conditions. An indication of the trading difficulties is given in a paragraph of the report which shows that, owing to the movement of consumers, 30,000 special meter readings have had to be made for changes of tenancy and the disconnection and reconnection of supplies.

Every effort has been made to maintain development, and standard hire facilities have been retained, with some modification of hire-purchase arrangements. Progress in domestic cooking and water heating has continued steadily, the number of cookers connected increasing during the year by 1,834 to 23,950, and water heaters, wash boilers and kettles by 4,527 to 36,992. Consumers at the end of the year numbered 99,076, an increase of 3,341.

Besides additional costs common to all undertakings—a sum of £12,771 was met out of revenue for air-raid precautions—the accounts contain a largely increased item for income tax—£30,250 against £2,500 in the previous year. This was due to the abnormally good financial result in 1938-39 (£102,108 profit), together with the general rise in taxation. Nevertheless, after meeting all these charges there was a net revenue surplus of £65,597. Charges were not raised during the year, but a small advance (5 per cent.) has since come into force. The average price per kWh sold decreased during the year by 0.013d. per kWh to 0.865d., while the average cost rose by 0.029d. to 0.848d.

Scarborough

Surveying the results of the past year's working of the Scarborough Electricity Department, Mr. W. K. Fleming, borough electrical engineer, says that steady progress was maintained in the development of the undertaking under difficult conditions, as is shown by the fact that the number of consumers increased by 1,038 to 18,079, while 4,522 kW of new connections was added. Altogether 19.3 million kWh was sold, a slight advance on the previous year, but excluding bulk supplies the total was a little below the 1938-39 amount—18.2 million against 18.3 million kWh.

The effect of the extensive reorganisation work which has been in progress for some time is reflected in a reduction of £4,849 in working expenses, and this was largely responsible for the increase in the net profit to £7,767, compared with £2,237 in the previous year. The total revenue was £159,697 and the gross profit £58,530. Up to the present no increase has been made in the rates for supply since the outbreak of war.

Chester

"A particularly difficult year" is the description given by Mr. S. E. Britton, engineer and manager at Chester, to the twelve months ended March 31st last, in his annual report. There was a loss on the year's working of £1,303, and after providing £4,099 for purchase of meters, £1,250 for purchase of land, £2,719 for expenses in connection with the Queensferry local inquiry, and £603 for change-over expenses, the balance on appropriation account was reduced from £23,536 to £13,561. It is pointed out that the £13,315 in the reserve fund is only 14.4 per cent. of the amount which may be placed to this purpose. If a loan of £3,000 is sanctioned for meters, the visible additional expenditure to be provided for during 1940-41 is £26,700, and to meet this it is proposed to increase tariffs and hire charges by 20 per cent.

At March 31st there were 21,962 consumers, an addition of 988 during the year. Of the premises in Chester itself 91.4 are now connected, and including Hoole urban district and the large rural area the proportion of premises supplied is 78.8 per cent. Of the 1,597 agricultural holdings in the area 862 are connected and during the year consumed an average of 3,904 kWh, representing a revenue of £17.96. Altogether, sales increased by 5.4 per cent. to 34.1 million kWh, but excluding bulk supplies there was an improvement of 11.8 per cent. to 29.3 million kWh. Total costs rose from 0.7975d. to 0.8520d. per kWh sold.

Eastbourne

The exceptionally cold weather experienced almost throughout the last quarter of the past financial year resulted in a largely increased output for that period, which almost compensated for the loss in sales due to the war—the total for the year was 38.0 million kWh, against 38.3 million kWh in 1938-39. At the same time, as the cold spell came after the close of the operative period of the bulk supply agreement the maximum demand of 16,950 kW is not borne by the accounts for the year under review. The chargeable maximum demand was only 12,550 kW, compared with 15,350 kW in the previous year, and there was a consequent reduction in the kW charge of £14,530 and a net bulk supply saving of £10,779.

On this matter Mr. N. Boydell, the borough electrical engineer and manager, comments that approaches have been made by undertakings, individually and collectively, for a more stable arrangement for the payment for bulk supplies, but without success. The reply invariably received from the Central Electricity Board is that a balancing fund should be created.

Due to this saving, the undertaking's accounts show a net profit of £5,878, as compared with £3,175 in the previous year. Income amounted to £229,942 (against £242,014), and working expenses were £104,408 (£115,186). The average price received per kWh sold decreased from 1.29d. to 1.26d., total costs falling from 1.33d. to 1.28d. New consumers connected during the year numbered 511, making the total 21,030.